Jimmy Domingo/Isis photobank

Chapter 3

LET'S GET DOWN TO SPECIFICS

We are almost at the end of our journey through the world of workplace health and safety. This last chapter contains more of the tools you will need to begin to understand and tackle some of the more obvious problems found in your workplaces. The list and tables found at the end of this chapter will give you additional guidance. In some ways, this is a dry and dusty chapter full of technical information and strategies. But colour and light will come along the way when you take these words and use them with your sisters and friends to bring about improvements in your working life. These are the tools that can save lives!

This final chapter comes in two major parts:

The first part provides additional information about some of the things that have been mentioned earlier in this book such as what we mean by good ventilation, and why and how noise affects hearing. The objective of the first part is to help you understand the technical processes described and how to assess when you look systematically at the workplace. The information presented here will help you assess if you need to seek additional help from labour inspectors, trade union delegates, or technical experts used by labour groups.

The second part of this chapter describes workplace hazards and outlines some strategies that you may consider useful in your struggle for workplace reform. These strategies can be used to influence one particular company or the whole sector. Women, who are already members of trade unions or women working together in an informal group can take up these ideas and put them to use. They are not meant to replace what you have already done but to add to your menu of actions and tactics.

In the annex, you will find a variety of information, lists and illustrations. There are checklists to help you with workplace inspections as well as lists of chemicals that are known or thought to cause cancer and reproductive difficulties. Also listed are those widely-used chemicals that have specific actions on the body.

But first, let's look at some of the technical aspects of workplace health and safety. When reading this part, think also about what you do at home: the products that you frequently use; and the ways in which you go about the tasks of home and family maintenance.

All the information in this book can be equally well applied at home. After all, the home is just another workplace for women. Household chemicals, such as bleaches and pesticides, can be more dangerous than chemicals encountered at work. This may surprise you but while workplaces are compelled to institute controls, there are no such demands for controls in people's homes. Children, who are unable to understand the nature of danger, are at risk from hazardous materials used in the home, especially if the chemicals are stored in soft drink bottles or other containers they associate with something delicious and nice. One household glass cleaner widely available in many supermarket chains, on a closer reading of the label, contains hydrofluoric acid, which can be very destructive to skin and flesh. Children playing with and spilling this type of product can be seriously injured, particularly if the right type of first aid is not immediately administered.

While our homes can be our castles, as the old saying goes, we have to make sure the dragons stay outside!

Fundamentals Of Occupational Health: Who is Responsible?

Workers, particularly women, are often blamed by managers and national governments for accidents and ill health at work. How many times have you read or heard news reports saying that several workers had been injured because of their own carelessness or a lapse of concentration? What has come to be known as *worker blaming* has a long tradition in all parts of the world. In the industrialised countries of the West, trade unions have battled to overturn what they label as the "Myth of the Careless Worker." Widespread belief in this myth allowed companies to escape their responsibility of preventing accidents.

Saying that workers are lazy, careless or stupid is an easy thing to do. It takes the focus off from:

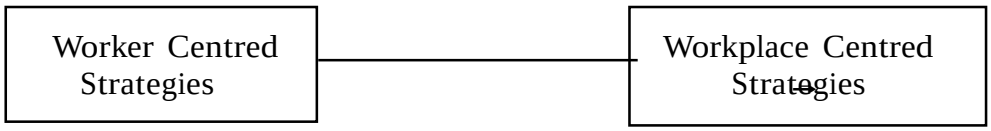
- poorly designed workplaces;
- poor or absent training;
- excessive working hours; and
- the use of dangerous substances.

Workers, through their responsible and systematic campaigns, have shown the shallowness and silliness of this belief. They have instead insisted on becoming fully functioning participants in occupational health and safety activities. Now, in many parts of the world, newly revised laws ensure that workers' representatives have full and protected roles for acting on behalf of their friends at work.

Alongside that progression from worker blaming to workers' participation has occurred a shift in priorities and strategies for workplace reform. Previously, the emphasis was on making women or men bear the burden of occupational health by enclosing them in protective clothing or by barring women from certain types of work. This, in essence, made workers pay for the prevention of accidents or diseases, by putting them into hot and uncomfortable clothing, or by socially isolating them within control booths or barring them from

work completely. Women, because of their "reproductive function," were denied opportunities to learn new tasks and to work in challenging areas because of risks. Gradually, the emphasis has changed to that where the onus is on management to provide safe places of work for all, regardless of sex.

In short, this means that the strategies that form the basis of occupational health practices have changed from being focused on workers to removing or minimising the risk.



Now, the first priority is to substitute *that which is risky* with a non dangerous substance or process. *If this is not practical, the employer has to reduce the risk by* reducing the concentration of dangerous materials by using engineering controls such as ventilation.

The tradition of isolating the worker through the use of protective clothing and equipment or barring them from employment has become the last and least acceptable strategy. Instead, redesign of the workplace, job sharing, or other forms of work design which reduce contact with the dangerous substance or process have been introduced. For instance, job rotation and multiskilling can reduce the risk of muscle and joint injuries caused by rapid and repetitive work such as packing or assembling.

These words may look a bit technical but they have simple explanations. You may find these terms in books or data sheets about chemicals. It is important to know what they mean. It also helps you understand the levels of danger presented by the vast number of substances that you meet in your everyday life and at work. Let's first look at the concept of *dose response*.

Dose Response

Dose Response and Threshold Limit Values (TLV)

The first thing is to understand that despite the danger of certain substances, they can *only do us harm if they enter our body*. To do that, the substances have to be in a form that allows them to pass through the nose or throat to the respiratory (breathing) system, through the skin and into the bloodstream or into the digestive system. While some chemicals can enter the body after they have been splashed into the eyes, this route remains rather minor in comparison with the others.

An example of what we mean might be found in lead. We have already looked at the reproductive importance of lead in Chapter 1. Lead is very dangerous when inhaled as dust. It is also harmful when heated, which is what happens when petrol containing lead is allowed to be used in cars. The fumes can enter the body by being inhaled. Lead in paint can enter the skin. But a block of lead is not dangerous at all—unless you drop it on your toe!

Similarly, some solvents (chemicals that dissolve other chemicals) may only become dangerous when heated. Then they give off dangerous fumes that pass into the lungs where they can blend into the bloodstream and be transported to vulnerable parts of the body.

In other instances, chemicals that are safe to eat or drink such as water can be fatal if they pass into the body in an unusual way. For

instance, inhaling water (not steam, which is what water becomes when heated) can lead to death because the lungs become waterlogged and cannot absorb oxygen—which is what happens if a person drowns.

So the first principle is:

> *A substance is potentially harmful only if it is able to enter the body. The form in which it can enter the body may not be that which we normally encounter it. So, the basic form of prevention is to limit the amount of or opportunity by which substances can become converted to dangerous forms.*

Now this leads us to the concept of *dose response,* an understanding of which is basic to the understanding of occupational health.

> *The degree to which your health is at risk at work* (response) *is dependent on the amount of time you are directly exposed to the substance, the concentration and toxicity* (the dose) *of that substance, and your general susceptibility.*

A simple example, following from the above, is that water is not dangerous when we have it in small amounts. In fact, without water we can't live. But in large amounts (that is, large doses) such as during floods, when a person is in water for a long time, water becomes dangerous. We may drown or die from the cold (response). Thus, what is normally a harmless substance like water can be deadly in large doses. If we can't swim, we are even more susceptible!

However, some substances are very dangerous in small amounts over a short time. For instance, some forms of radiation and things like cyanide or chlorine gas fit this category. While others are not dangerous in the short term over a long time, they can accumulate in the body and cause cancer. A good example of this type of substance is benzene. Hence, the need for a clear and comprehensive information.

Occasionally, the dose response relationship may be influenced by differences between individuals, particularly their existing state of health. Women, it is thought, may store cancer-causing chemicals longer in their bodies if these chemicals mix easily with body fat. Some people with breathing difficulties, such as asthma, may be more vulnerable to dusts. Those people who work very hard and, therefore, breathe harder, may inhale the same amount or a lot more of a hazardous substance than others who are working at normal pace over the same period of time. For instance, a woman packing, carrying and dispatching boxes of electronic goods may inhale the same amount or more of "fugitive" (the technical word for escaping) soldering fumes as with women assembling components, even though she is farther from the source.

> *So, merely moving someone from a dusty job to avoid the cost of fitting the workplace with the necessary protective technology may not solve the problem at all.*

So, how do you know which chemicals are volatile (easily converted to fumes when heated)? Which are highly toxic in small doses? Technical data sheets known as Material Safety Data Sheets (see Chapter 1 and Annex 1), which are required in all Western nations using chemicals, will tell you about the dangers of substances found in your workplace. International labelling laws require companies making chemi-

cals to put information about the chemical on the container, and to provide Data Sheets to regulatory agencies such as the Departments of Labour or Health, in importing nations. These Data Sheets are copied and are made available to employers and trade unions for information. Your trade union or women's group can request for them through your Department of Labour or Health or straight from the factory.

Some countries in Asia producing chemicals for other Asian countries do not obey these laws as labelling regulations and enforcement of existing laws in the developing world tend to be less strict. Women need to get hold of this information to protect their health and their future. The provision of technical information should, therefore, be the centerpiece of any health and safety campaign.

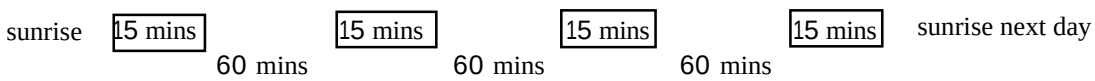
Threshold Limit Values

This term is usually shortened to TLV and refers to the permitted exposure to various dangerous substances. Sometimes you will also find the terms:

TLV-TWA which means Threshold Limit Value at *Time Weighted Average* and is the same as TLV. The **TLV-TWA** is the amount of substance that an average person can be exposed to for an **eight-hour working day, five days per week** (that is, a standard 40-hour week) without any adverse effect.

TLV-STEL which means the maximum concentration of substance at which a person can be exposed to for four 15-minute periods per day (4 x 15) in any one 24-hour period. **STEL** stands for *Short Term Exposure Limit*. To make it more complicated, each exposure period should be separated by a period of at least 60 minutes.

That is



In the developing world, using this measurement as the standard for exposures has many drawbacks:

1. Many women work far in excess of eight hours per day, particularly those working under target systems or those paid by the piece ("piecework").
2. The TLV is calculated based on a five-day week as this is the length of working week for most workers in the industrialised world. The majority of women in the developing world work six or seven days a week.
3. When regulators use the word "average," they usually refer to single, young, white males. The original standards were set using men from the U.S. armed services who, after lots of physical training, are anything but average! Women, pregnant women, asthmatics, diabetics and others of small size, or those who are very thin or very fat were not included. Many of the standards in the industrialised world have been revised, but those in the developing world may still reflect the old standards.

4. Some standards are set for economic reasons. The noise standard was left at 90dBA because it was argued that the cost to industry if the standard was lowered to the safer 85dBA would be too expensive. A statutory level of 90dBA would limit rather than prevent hearing loss. To fit machines with noise dampening devices was regarded as too expensive. After more detailed research, information showed that workers still risk deafness at 90dBA. A lot of pressure was exerted from trade unions, and the noise limit in many countries was dropped to the safer level of 85dBA.
5. Research has simply not been done on women workers, which would enable scientists and occupational health practitioners to make categorical statements about whether the existing TLVs meet the needs of women. Points made elsewhere in this book point out that women, for instance, may store more poisons in their body fat.

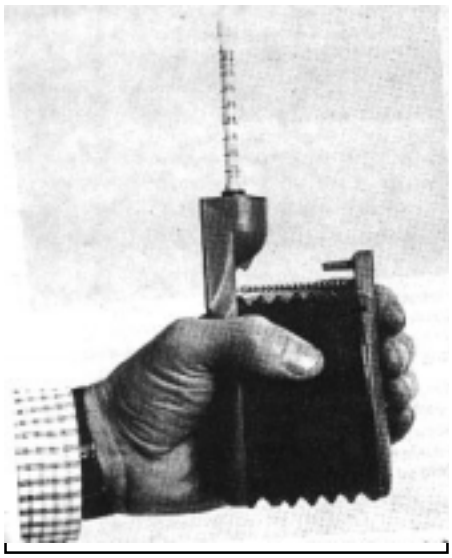
Because of these flaws, TLVs should be regarded as the absolute minimum levels to which employers should conform. Workplace surveys should be conducted by the workers themselves to monitor any unwanted effects of chemicals on women.

How are TLVs Measured

To measure whether or not the airborne concentration of a substance is above or below the TLV requires technical equipment that is beyond the scope of most women workers. Not that it is too complex to use, but simply because it is too expensive. For instance, usually a system of electronic or manual monitors are used to measure the level of contamination in the air. Occasionally, if a chemical arouses the concern of safety inspectors, workers can be asked to wear a badge or small pump near their face so that the personnel from the Department of Labour can measure how much of the fumes or dusts are being inhaled by the workers. You may have already been asked to wear one of these. They look a little like the microphones they put on television personalities!

To monitor more dangerous chemicals like hydrogen, labour inspectors will put a machine that looks like a small box with a few dials into the workplace. This machine, called a *static gas monitor*, has an intake for air, a small pump or passive airflow and devices inside which measure the concentration of gases, fumes or dusts in the air. Fluctuations, measured in concentrations of the gas during the day, can be seen on the dials in the front or on a readout tape at the end of the day. Some are fitted with alarms, particularly those that measure the concentration of very dangerous gases such as hydrogen sulphide, ammonia, chlorine or phosgene. The alarm rings when the airborne concentration rises beyond acceptable levels. They are frequently used to detect levels of methane and other potentially explosive gases, or those that can replace air and suffocate workers. Labour inspectors should inform workers of the results of this monitoring. Women, on the other hand, can take the initiative by asking for the monitoring results and for an explanation of such results.

At other times, inspectors will use a small hand-held pump with a



Drager tube (Courtesy of Draeger Safety Group Ltd.)

glass tube inside to test the air. This is called a Draeger pump, after the company that first made it. The pump consists of a glass tube filled with crystals that change colour (react) in the presence of gases. This is the cheapest air monitoring device to buy and in many developed countries, trade union representatives carry their own. But the cost is probably still too high for women in the Majority World. So, asking for monitoring results from labour inspectors (or from management) is the next best thing to do.

The other way to determine if the levels are too high is, of course, by listening to the women at break times and asking them if they feel any different from usual. If a few women share the same symptoms, for instance, headaches, feeling dizzy or weak, then you can be virtually sure that something in the workplace may be responsible (except if there is a nasty infection like Dengue fever which may be plagueing the local community, then it could be illness that is causing the symptoms). The list of chemicals and signs of poisoning at the back of this book provides a useful first point of reference.

Now we shall turn to some of the methods used to reduce the potential dangers of dangerous substances and make sure workplace levels stay within the TLV.

Ventilation

There are times when the dust is so thick I can hardly see what I'm doing. I wake up at night with this awful cough and feeling like I am dying. I can't breathe—Thai Textile worker

Of all the technical methods that can be used to reduce occupational diseases, ventilation is one of the most effective. It is also the most commonly found faulty design in the rapidly increasing number of factories in the developing world. Many enterprises simply rent their building and as a result, the design is usually unsuitable for the types of activities and substances used. Some factories do not even have enough toilets for the number of workers employed. Factory buildings constructed with an eye to cost, not to safety and health are frequently poorly ventilated. In cases where highly dangerous dusts and chemicals are produced by the production methods used, purpose-built[1] premises should be, but rarely are, constructed. As a result, fumes and dusts are trapped within the building and are inhaled by the workers, which cause diseases.

We all know that if we inhale smoke from our cooking stoves at home, or if a member of our family opens a bottle of kerosene in a small room, our bodies quickly respond with coughs, runny noses or red watery eyes. We often rush to open widows and doors to allow the smoke or fumes to escape. Factories are no different except that the workers often cannot open windows or doors, and instead have to put up with the discomfort.

[1]Purpose-built is a technical term for buildings that are especially designed for the purpose for which they are used. Occupational health and safety considerations are integral to purpose-built constructions.

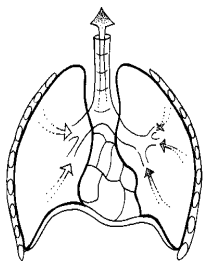
How Our Lungs Work and Why Ventilation is Important

We need three things to live: air, food and water. Love is important which we need to feed our souls and our hearts. But the fuel for our bodies comes mainly from water, food and air. Our lungs are miracles of creation that work for us when we are asleep and unconscious of our breathing. They continue to expand and contract each day of our lives, taking air in from which the body takes oxygen, which then mixes with the blood and then transported to the rest of the body.

Structure of bronchus and bronchioles which convey the air deep into the

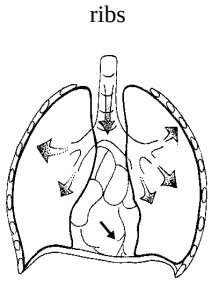
Our lungs are divided into two parts which sit on each side of our chest. Our respiratory system, including our lungs, are further divided into upper and lower respiratory tracts. The upper tract consisting of the nose, throat and the larger bronchi, while the lower respiratory tract refers to the smaller bronchioles, the alveoli and lung tissues.

When we breathe in, air enters our noses or mouths, passing down ever finer and finer tubes until it gets to the finest of them, which you need a microscope to see. These are called *alveoli*. The bigger tubes are called *bronchi and bronchioles* (see drawing). The lungs are made of spongy, soggy materials which are able to expand and contract with ease. You may have seen or eaten animal lungs; human lungs are very similar in appearance. The structure of the lung, being made up of these finest of all tubes, enables the maximum amount of oxygen to be absorbed by the blood.



Inhalation

If we breathe through our nose, the hairs in our nose clean the air before it gets to our lungs. Similarly, breathing through our mouth encourages mucous to trap any dust and other tiny things, preventing them from entering the lungs. Under normal circumstances, our bodies are able to safeguard the function of our lungs. But breathing in lots of dust or dangerous fumes can overwhelm the body's attempts to maintain "good housekeeping." The dust and fumes are able to enter the lungs unobstructed, causing damage and scar tissue. If there is too much scar tissue, the lungs lose their elasticity and as a result, mental concentration is needed to breathe. It is common for miners, woodworkers and long-term smokers to wheeze and gasp for breath later in life because of the amount of scarring in their lungs. Emphysema, a disease caused by smoking and dust inhalation, and where the tiny alveoli break down and become larger cavities (which means that there are less absorbent "walls" through which oxygen can enter the body) causes similar conditions and symptoms.



Exhalation

Our respiratory systems have other safety mechanisms. For instance, the throat will automatically contract rapidly in the presence of high levels of ammonia or other dangerous gases. We also cough in the presence of smoke or other airborne "nasties" that threaten our breathing.

The other reason for good ventilation is that lungs allow the

transfer of oxygen into the bloodstream. If the air we breathed in contains dangerous chemicals which may be quite safe for the lungs, chances are the chemicals may also dissolve into the blood and be carried to other parts of the body where they *can* cause harm to particularly susceptible organs such as the liver or kidneys.

But despite all the body's defences, sometimes small doses of harmful materials can still enter. For instance, asbestos fibres—which are some of the finest naturally occurring fibres known to humankind, and used in all sorts of things such as the grey/white mats upon which to put hot irons—can still enter and find their way deep into the base of the lungs. After many years, they can cause a horrible form of fatal lung cancer. This is why it is necessary to ventilate spaces where harmful materials are used or *better still, to eliminate dangerous substances*. Lung disease is often permanent and very disabling. So, breathe deeply. Enjoy the sensation of the air coursing through your body, bringing life-giving oxygen. It's worth staying like that.

Industrial Ventilation

Many industrial processes produce harmful airborne substances that can damage health, change behaviour and cause harm to the surrounding environment. So, it is not enough to simply help the dangerous materials escape from the factory; heavily laden toxic air has to be cleaned (the technical word for this process is "scrubbed") before it can be released into the open air. After all, people, including many of the workers, live outside the factory walls and can become poisoned by the "fallout" from factories. For women working in the factory producing the fallout, this means "double exposure."

In dusty or vapour filled factories, opening windows is a good start but it should not be left at that. Some dust and solvents are so dangerous that they need specific engineering management. For instance, metal fumes, solvents, acid fumes and some oganochlorines are very toxic, and need to be kept at minimal levels through special ventilation systems.

Although the precise control of specific hazards requires engineering skills, the knowledge detailed below will assist women workers to decide whether or not a situation needs further technical and engineering help.

Women must be familiar with the nature of the airborne hazard. There are seven major categories. Do not feel daunted, as it is not necessary to learn them by heart. The terms are frequently used in technical literature including Material Safety Data Sheets, so it is helpful to know what they mean.

Dusts. Generated by drilling, crushing, grinding or handling materials, and are finely divided solids. They may arise from mineral sources (for example, rock, coal or asbestos), wood, or plant sources such as grains and cotton.

Fumes. Very fine solid particles condensed from the vapours of materials when a chemical is heated or reacts with another. For instance, the process of welding gives off a form of smoke which is the fume from the heated metal.

Mists. Airborne liquid droplets that form if liquid is splashed, sprayed or foamed. A good example of a mist is that which comes out of a can of hair spray or pesticide.

Smokes. Result from fires that aren't burning well and usually contain a stuff called carbon, which is the black residue/dust.

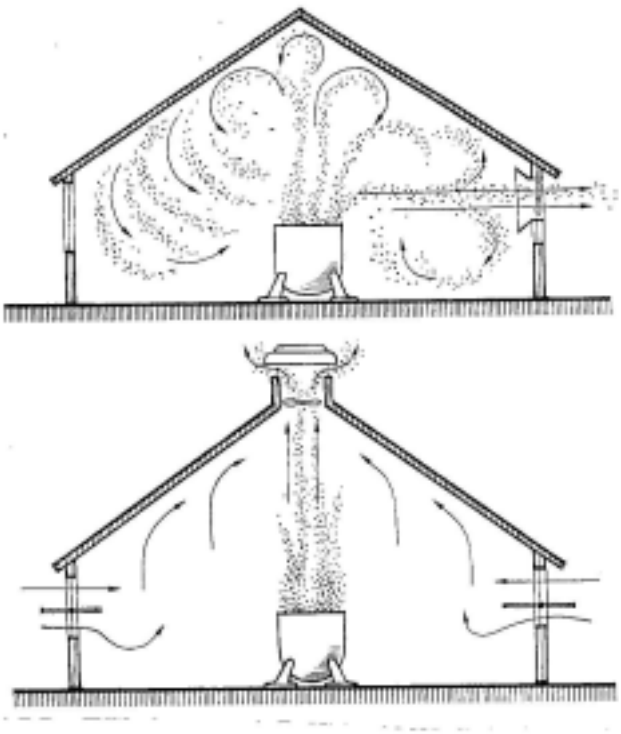
Vapours. Gaseous form of substances which are normally liquid or solid in form. They mix readily with the air and may reach explosive limits. For instance, when nail polish remover evaporates, it forms vapours.

Gases. Formless fluids that expand to occupy the space available. They may form liquids or solids when exposed to changes in temperature or pressure. "Dry ice" is actually frozen carbon dioxide which converts back to gas when left at room temperature.

Living Agents. Bacteria, mould or other organisms.

Why Should This Classification Affect Ventilation?

The type of ventilation (control mechanism) needed is dependent on the weight and density of these airborne contaminants. If a chemical is a "heavy" fume, it will tend to sink rather than rise. A "lighter" vapour, for instance from an acid or solvent, will tend to rise if heated. Importantly, methods of ventilation appropriate to vapours may not be effective for getting rid of heavier dusts or heavy metal fumes. For instance, it is better to exhaust metal fumes at a level *lower* than working height as the fumes are "heavy" and, thus, it is easier to assist this natural movement by *sucking the fumes down* rather than up. This approach is not only energy efficient but is likely to get rid of most, if not all, of the fumes. Trying to use conventional exhaust ventilation *above* the source



Use Natural Air Flow

How hot or cool it is in the workplace will influence how the air moves inside. Sources of heat such as ovens or machinery will heat the air causing it to move upwards. If a process produces dangerous fumes, this natural movement of air will take the fumes up and out if the place is designed well. Ventilation at ground level, which works against this natural force, will be ineffective.

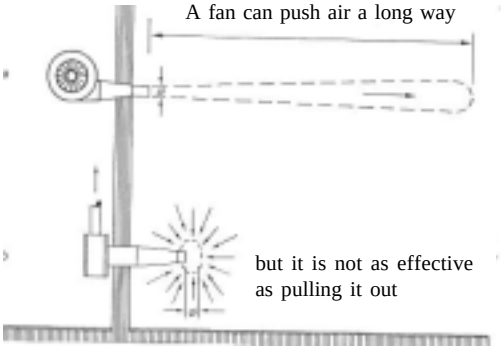
of the fumes (such as a spot welding machine for electrical components) will be less successful and will use more energy (and costs more to operate).

Ventilation is used to *dilute* (thin out) or *control* the concentration of airborne contaminants. Two methods can be used:

Dilution Ventilation and Local Exhaust Ventilation

Dilution is best used with less hazardous dusts and vapours. Dilution ventilation reduces the concentration of dangerous substances by introducing large amounts of fresh air into the work area. The change of air can occur passively by opening windows and doors or by mechanical means, for instance, by using push-pull fans (see illustration).

The more hazardous the substance, the greater number of times the air needs changing—like the bed sheets of a feverish child. This means that if the company uses reasonably dangerous solvents or produces soft wood dust, it cannot rely on open windows. It has to install mechanical ventilation. An engineer is needed to determine the number of air changes needed per hour. However, without engineering advice, the minimal number of air change required is four per hour (once every 15 minutes), with the maximum being 60 changes per hour (once per minute). If women are in doubt about the quality of the air in their workplace, they should request an engineer to look at the situation at the management's expense.



Exhaust fans alone are usually not enough to remove heavily contaminated air from a workplace. Using an additional fan to 'push' air in the direction of the exhaust fan which is 'pulling' the air out, makes the system more effective. Some machines have this system built into them.

While dilution ventilation is better than nothing, it has several disadvantages:

- ❖ The cost of having 60 air changes/hour is high as the amount of electricity needed to drive this system is enormous. If the area is very large and the tasks involve the use of very toxic chemicals or metal fumes, this type of ventilation may still not dilute the fumes sufficiently. So, the cost may be high but the results are poor or mediocre.
- ❖ If the system has to extract air from a large area, the air surrounding the workers may still contain contaminated air. In some cases, the system may draw contaminated air past the worker's breathing zone.[2]
- ❖ If the rate at which dangerous fumes or dusts are created or released goes in cycles rather than at a steady regular pace, the air exchange rate will not be able to keep up when the air is saturated by dangerous fumes at their peak.
- ❖ It is harder to specifically get rid of very hazardous materials that shouldn't be allowed to escape into the general environment. For instance, 60 air changes/hour may be needed to ventilate fumes created by only two widely separated dangerous jobs in a large factory floor area. It would be cheaper (and more effective) to use local ventilation.

[2]The breathing zone is that area around the face from which the person draws her breath. It is as large or as small as the range of workers' head movements during normal work.

Designs for several dilution ventilation systems are to be found on the next page.

Local (or Point Source) Ventilation is more effective as it removes the hazardous substance at the point at which it is generated. While it may be more expensive to install, the operating cost may work out to be cheaper. While dilution needs a lot of power, local ventilation only uses enough power to remove toxicants from small enclosed areas. So, it requires much less electricity and is therefore cheaper to run. It is very important for you to grasp these economic arguments as they are powerful levers for changing a boss' mind. Being able to talk in this way also indicates that you are aware of the economic realities and you "understand" their position. *Money usually speaks with a louder voice than morality.*

All this aside, there is no doubt that local systems are the more effective method for removing substances that may cause health problems in the working area. To be safe, women should try to have these systems adopted as the first line for negotiation.

Local ventilation is more effective in removing heavier dusts and metal fumes from workplaces, and is vital if the air needs to be cleaned (scrubbed) before it is released outside the factory.

An engineer may be needed to make sure that the design is suitable for the conditions and materials being ventilated. Sometimes air tumbling around inside the piping or dust settling into poorly designed pipes can interfere with the effectiveness of the ventilation process. So, it is important that the system be designed by an experienced specialist.

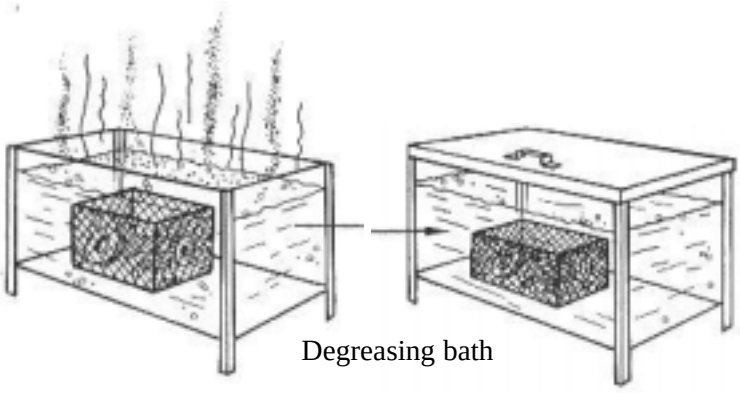
Illustrations of various types of local ventilation appear in the next pages.

To test the effectiveness of existing ventilation, you can use coloured powders like turmeric or poster paints, confetti (tiny bits of paper thrown at new brides in some countries), ribbons of paper, or spray fine mists of coloured water near the exhaust fans. Try dropping fine amounts from a high point—stand on a ladder or table so there is some drift—at different points in the room to detect "dead zones" or to see if the coloured dust or sprays are dragged into the workers' breathing zones. Map the results. (see below in Strategy)

Cheap Solutions

Some factory owners operate with such small margins that expensive ventilation systems are simply out of the question. But there are some things that can be done cheaply.

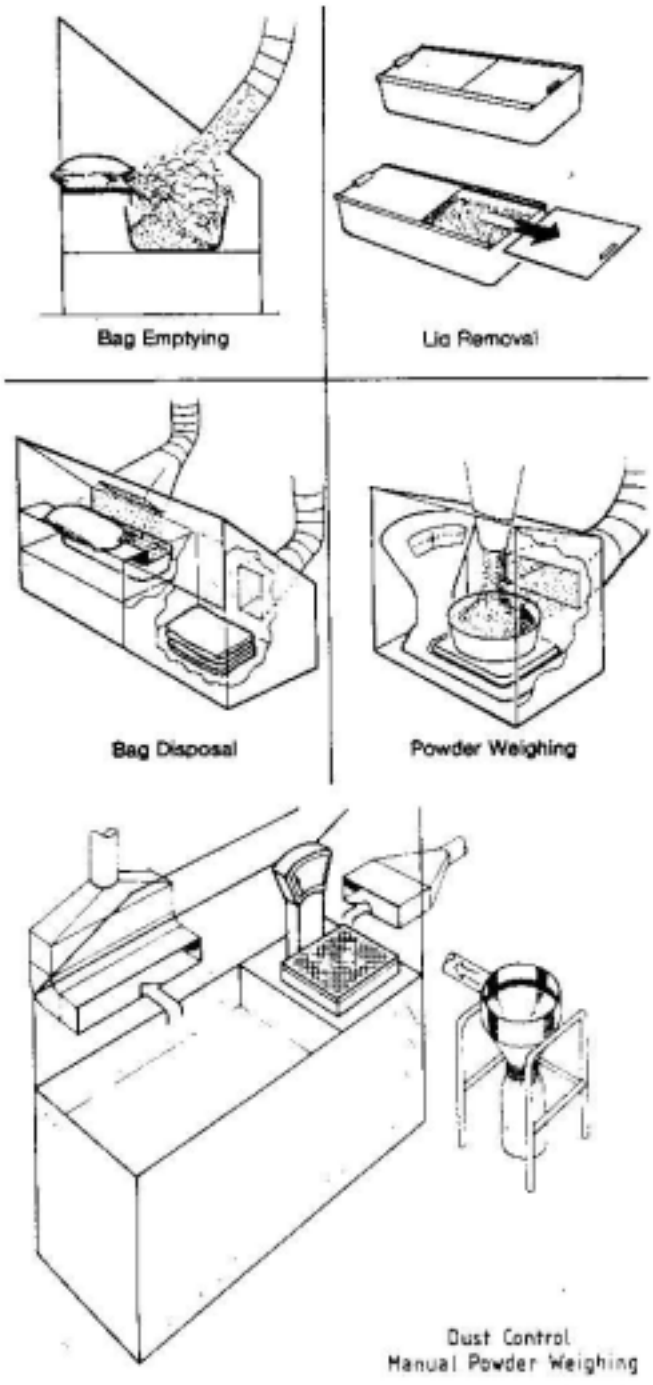
Using lids. Seal all containers of solvents and other strong chemicals using lids made from beaten metal, wood, plastic or rubber. Make sure that the containers are tightly sealed, particularly if the



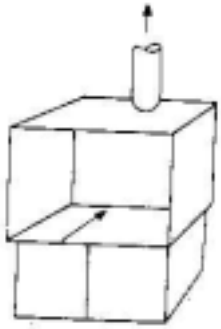
Degreasing bath

Enclose the degreasing dye bath and use baskets and tongs or chains to manuever the materials to avoid splashes and skin contact.

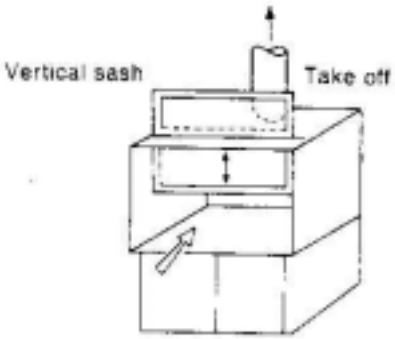
Ventilation Systems for Dusts and Powders



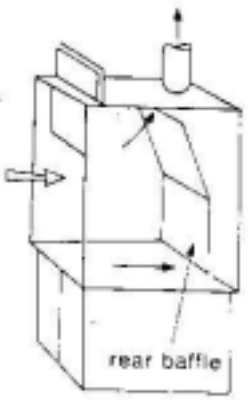
Weigh station dust control. Reproduced with permission from Annals of Occupational Health (1980).



This box can be used for handling chemicals. It is useful but not as effective as the one below.

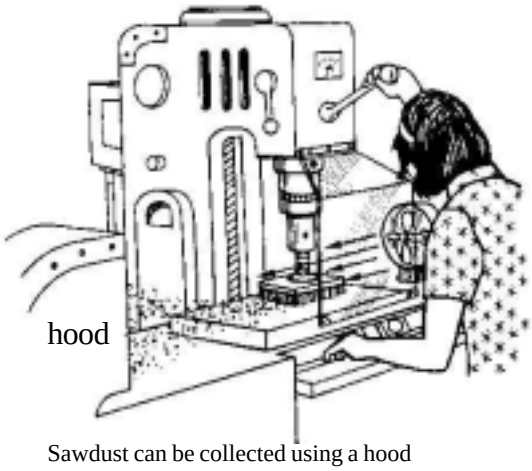


The cheap addition of a sliding window means that contaminated air cannot escape as easily.

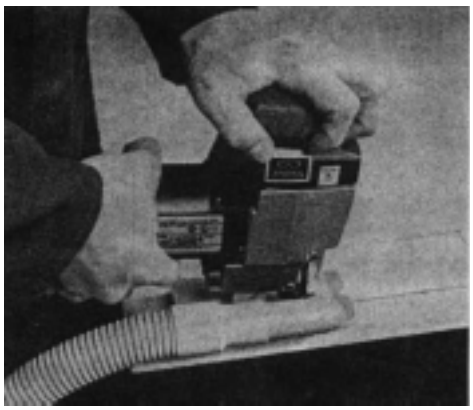


But this is the Mercedes Benz of ventilation systems. The curved wall at the back channels air up and out.

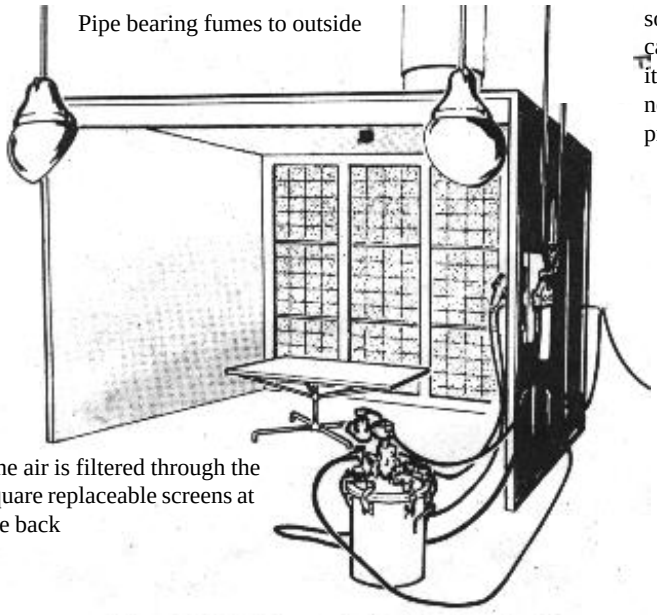
Forms of Ventilation



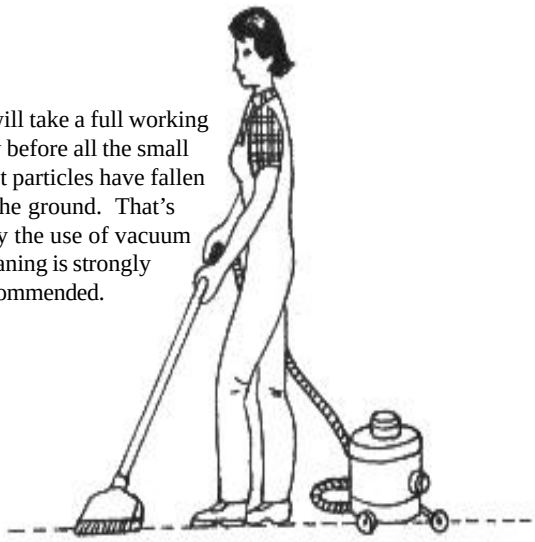
Sawdust can be collected using a hood (shown on the left side of the picture)



An ordinary vacuum cleaner can be used for some dusty jobs such as sanding. The nozzle can be attached to the sander to collect dust as it is created. Specialised vacuum cleaners are needed for chemicals and paints but the same principle applies.



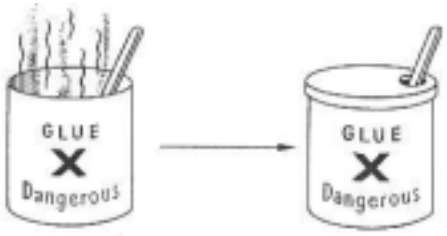
The air is filtered through the square replaceable screens at the back



It will take a full working day before all the small dust particles have fallen to the ground. That's why the use of vacuum cleaning is strongly recommended.

chemical is being heated.

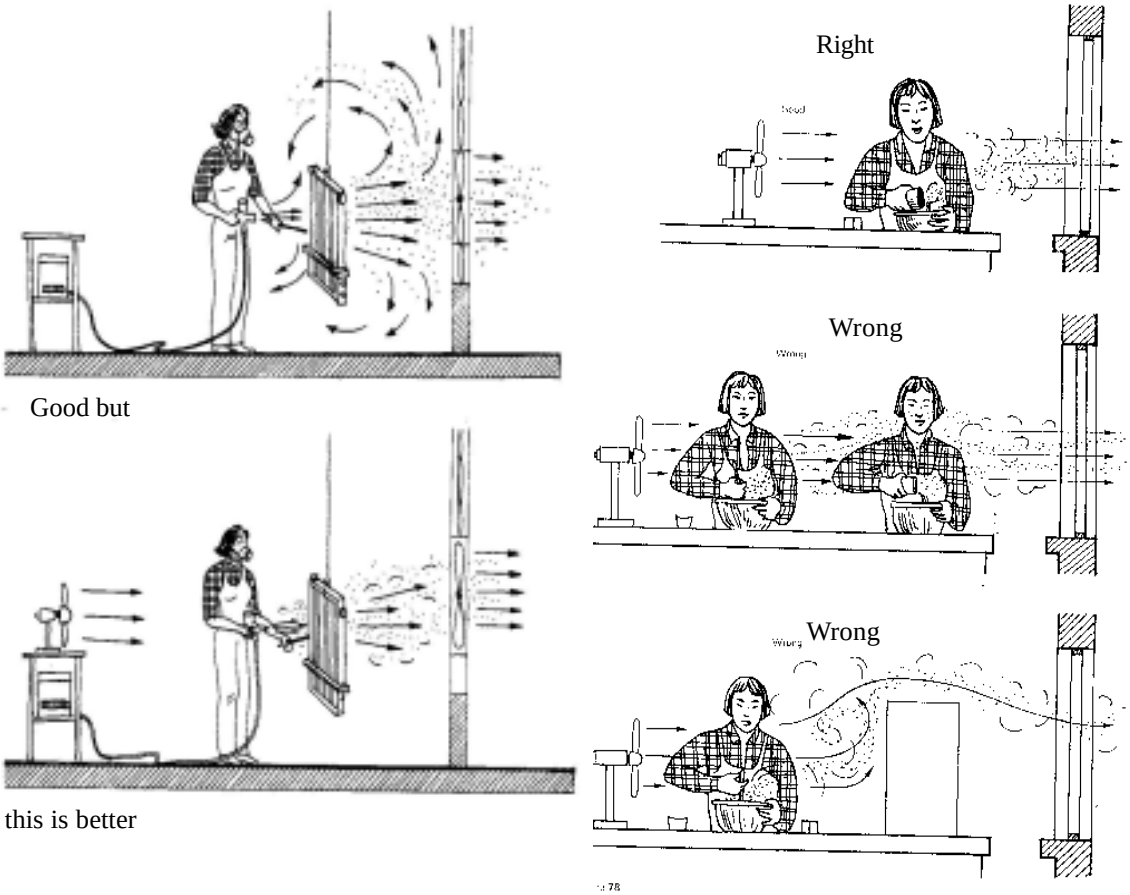
Use domestic fans. Small household fans can be placed on the work tables to blow dust and fumes away from the worker's breathing zone. Placement of fans is important (see illustration) to ensure that fumes are pushed outside, *not* into another worker's area.



Using a lid is a low cost way to reduce the risk of coming into contact with dangerous and possibly cancer-causing substances.

Relocation. Transfer any dangerous procedure outside the major factory space, to be done in an open walled hut, so that the fumes can escape into the air.

Use of fans to remove contaminated air



Maintain Housekeeping. Make sure the work area is kept clean so that dust is not stirred up. Use dampened brooms to make sure that dust does not rise again.

A Note on Traditional Beliefs

Effective ventilation is one of the most important ways of reducing the risk to your health in the working environment. But in some cultures, ventilation is associated with illness because people believe

that cold winds bring colds or 'flu-like' symptoms. In Indonesia, this is known as *masuk angin* (literally, "the wind entering"). It is important that women understand that sometimes the elements *inside* the factory can be more unhealthy than those that come from the outside, and that a balance or harmony is needed between the two.

In cultures where illness is attributed to these hot and cold elements, women need to be gently reminded that it is not a good idea to put plastic or newspaper over windows and vents to keep the wind out, as it destroys the harmony of the good elements that are coming in to balance the bad ones being generated internally. Such practices also reduce the amount of available light, making it hard to see for those doing fine work.

Noise

"I like the work at the textile mill as I have lots of friends. But for the last five months, I have had trouble sleeping as the machines keep following me home. I hear their voices all the time. I'm getting so tired."—Indonesian textile worker

Our natural world is full of wonderful sounds: the swish of rain on the rice crop, the sound of crickets, the wind moving the trees, and the excited chatter of children. The urban and industrial worlds are drowning those noises with amplified sounds: the clash of machinery, the roar of furnaces, the hisses of steam and the relentless cacophony of amplified music.

Can you imagine that in a few years you may suffer ringing or buzzing in your ears so loud that it keeps you awake? Can you imagine your grandchildren trying to tell you about some important events in their lives, and you are not able to understand them? Can you imagine a world of muffled noises where birds and insects, the wind in the trees, the singing of a woman as she goes about her work, or the sounds of passing food carts cannot be heard? This is the world of industrial deafness.

In 1908, a British factory inspector wrote about the link between loud noise and deafness after he read a report from a doctor about the severe reduction of hearing ability among boilermakers. Since then, men have been the target of noise education and prevention campaigns. Maybe because of the myth that women's work is safe, it was not realised that women, too, are at risk. It was the textile industry, in particular, with its intense and insistent noise, that alerted occupational health practitioners to the risks faced by women.

In addition to noise-induced hearing loss, exposure to noise in excess of 85dB (dB is the symbol for decibel–the measurement of sound) has been found to bring about fatigue and stress as exhibited by raised stress hormonal—adrenaline and nor-adrenaline—levels in the blood, which may contribute to early labour among pregnant women. High noise levels have also been linked to irritability, inability to sleep and high blood pressure.

If, in your workplace, you have to shout to be heard, or if the machines "follow you home," by making your ears buzz long after you have quit work, this part of the book is of great concern to you.

There is no good or bad noise, only noise that is too loud. This is an age of amplification and loudness. Listening to music in a noisy disco or playing a radio

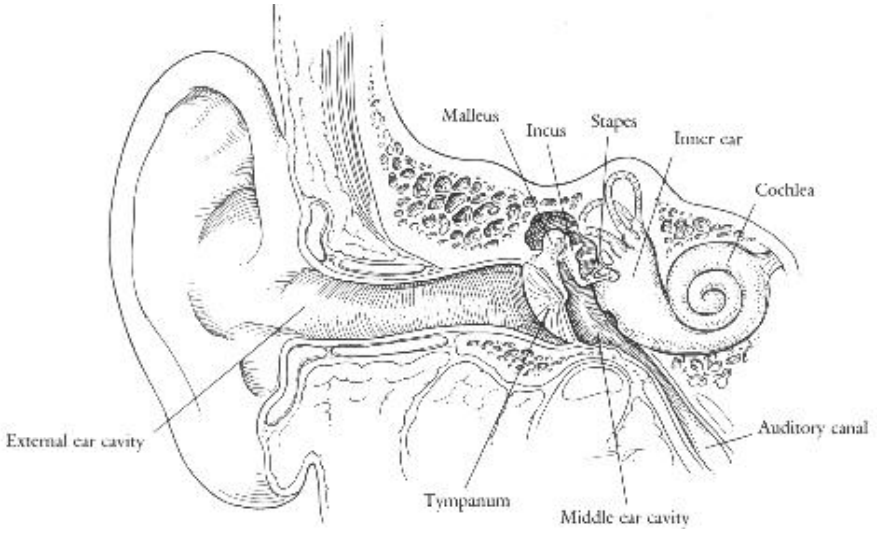
too loud and too close to your ears will also damage your hearing. It is difficult to find peace and tranquillity in a time where sound systems and amplifiers are used to advertise cheap underwear, the latest movie at the cinema, prayer times and music shows. Noise levels not permitted in industry are often found in dance halls, religious places and shops.

Our ears have evolved to respond to subtle natural noises—the noises of nature and the noises of danger such as that of animals approaching. Thus, the structures in our ears that receive, transmit and interpret noises and sounds are delicate and easily get damaged by continuous loud noise.

Why and How do We Hear?

We are the most communicative of the animals that walk on this planet. We have rich and complex languages and an array of signals that convey messages about how we feel, what we need or want, and about the daily events in our lives. Similarly, hearing allows us to respond to the environment in a rational way: to get out of the way of a speeding car, to walk closer to a source of water, to enjoy sweet sounds or religious chants, and to hear the distress cries of our children.

Noise, which is actually a series of vibrations in the air, enters the ear through the outer ear, which is designed to collect sound. Inside the ear is a series of fine membranes (a film of delicate tissue stretched over an opening known as the eardrum) which respond to this noise and conduct the vibrations inward through a series of small bones and into a sensing chamber called the cochlea. The cochlea, a snail-shaped structure, is filled with fluid and thousands of tiny fine hair which also vibrate with the noise. The fibres are connected to a large nerve, which in turn connects the ears to the brain. This nerve takes vibratory signals to the brain where they are "decoded" into sounds which have meaning to us.



Intense noise wears out the sensory fibres in the cochlea over time, making them lose their sensitivity. If the noise is not reduced or removed,

the fibres are eventually destroyed.

Five levels of hearing damages have been identified:

1. **Temporary Hearing Loss.** This occurs when the fibres are only temporarily disabled. Once the source of noise is removed, the fibres are able to recover.
2. **Permanent Hearing Loss.** Permanent loss can result from one very loud burst of noise, for instance, an explosion when the noise pulse is dramatic enough to permanently paralyse the fibres and to puncture the membranes. Permanent loss also results from long term exposure to loud noise, like that which comes from spinning and weaving machines.
3. **Tinnitus.** This is the technical name for the buzzing or ringing in the ears that results from low level damage. In the absence of the noise source, this annoying sound will leave you after a few hours or a few days. However, if you continue to expose your ears to excessive noise, the buzzing may stay with you for many years.
4. **Loudness Recruitment.** This is the name for a process by which the ears falsely exaggerate the changes in noise levels that are received. So, low sound levels may be heard as large booming noises. Sometimes the noise results in pain and can be very disorienting.
5. **Accelerated Natural Deafness.** One of the facts of life is that as we get older all our senses begin to fail. Exposure to loud noise early in life accelerates this process, and we become deaf earlier and faster than if we had not been exposed to the noise.

How Loud Is Loud? A Little Noise Technology

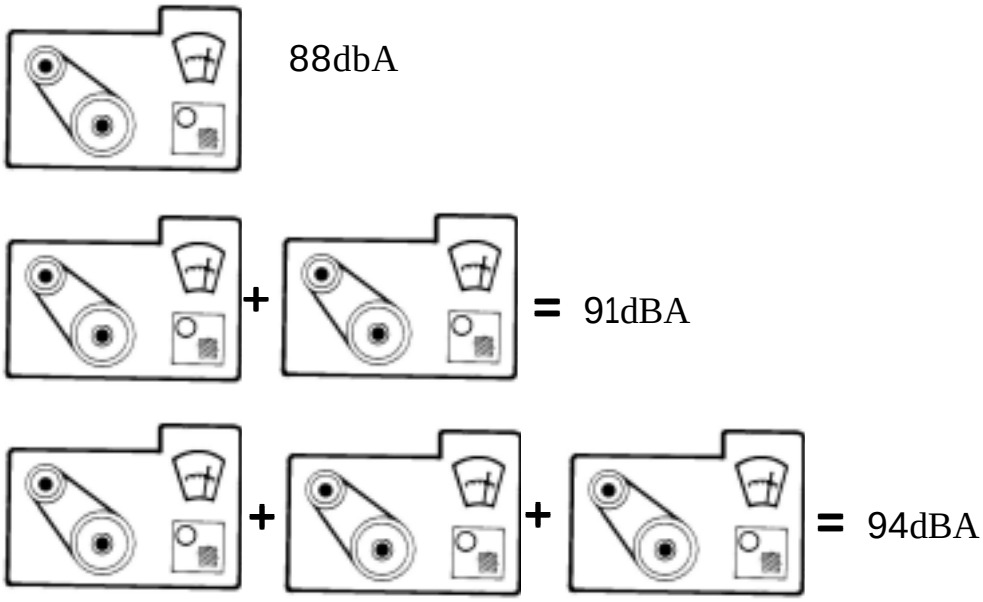
Noise is measured in two ways: one being the *frequency* and the other being the *amplitude or intensity.* Frequency refers to the vibratory quality of noise and it lets you know if the noise is high or low pitched. It is usually measured in Hertz (Hz), the number of vibrations per second. Often, low intensity noises are felt rather than heard—think of the sensations that go with rumbling thunder or the noise of a train coming.

Intensity refers to the pressure generated by the noise, and the energy generated by that noise. This is usually written as dBA—which indicates the scale on which the noise is measured. You don't need to hang on to this information—it just helps you understand "techspeak."

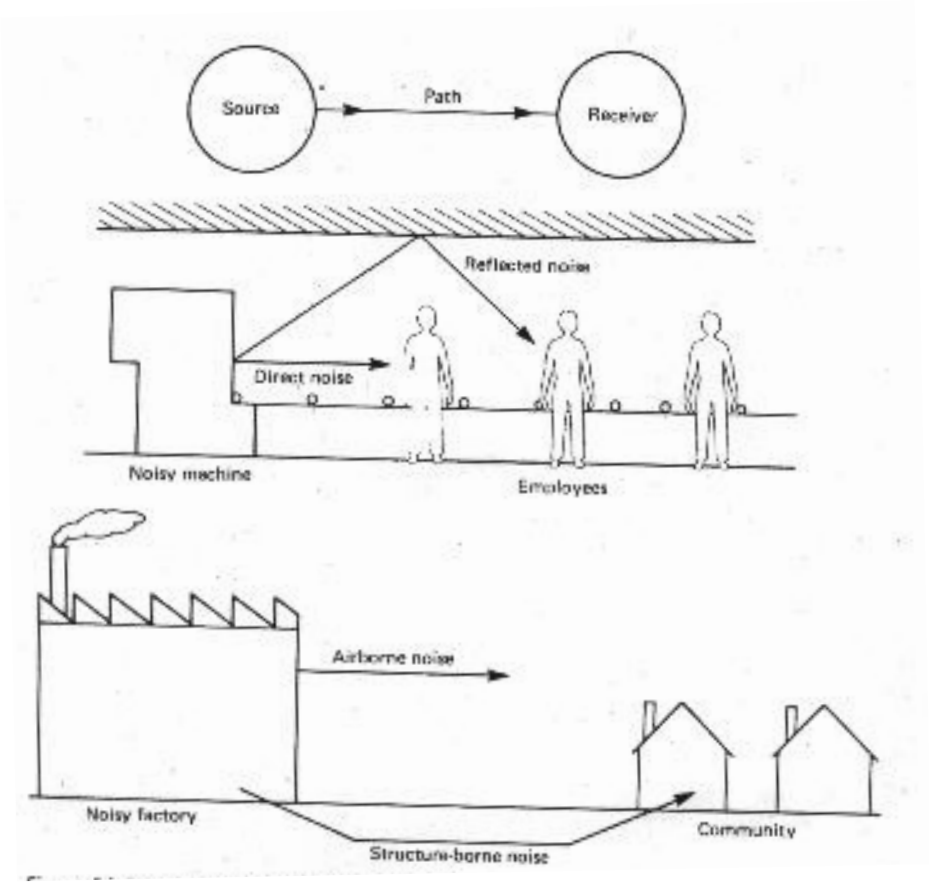
As our ear is sensitive to a huge range of noise—the quietest whisper is 100,000,000,000,000 times softer than the loudest tolerable noise—we need a special measurement to indicate the level of noise we experience. The name given to these indicators of noise levels are *decibels* (abbreviated as dB).

To make matters more complicated, the decibel is an unusual scale in that it is a logarithmic scale not an arithmetic one. If you have two machines, each making a noise that has been measured at 85 deci-

How Decibels Are Counted



Noise source, path and receiver



bels (dB), *then the resulting total noise will be 88dB not 170dB.* That is, *for every doubling of noise, the dB level increases by 3 decibels (dB).* Having four machines, each making 85dB, would increase the noise to 91dB (85 + 3 + 3 + 3 = 91).

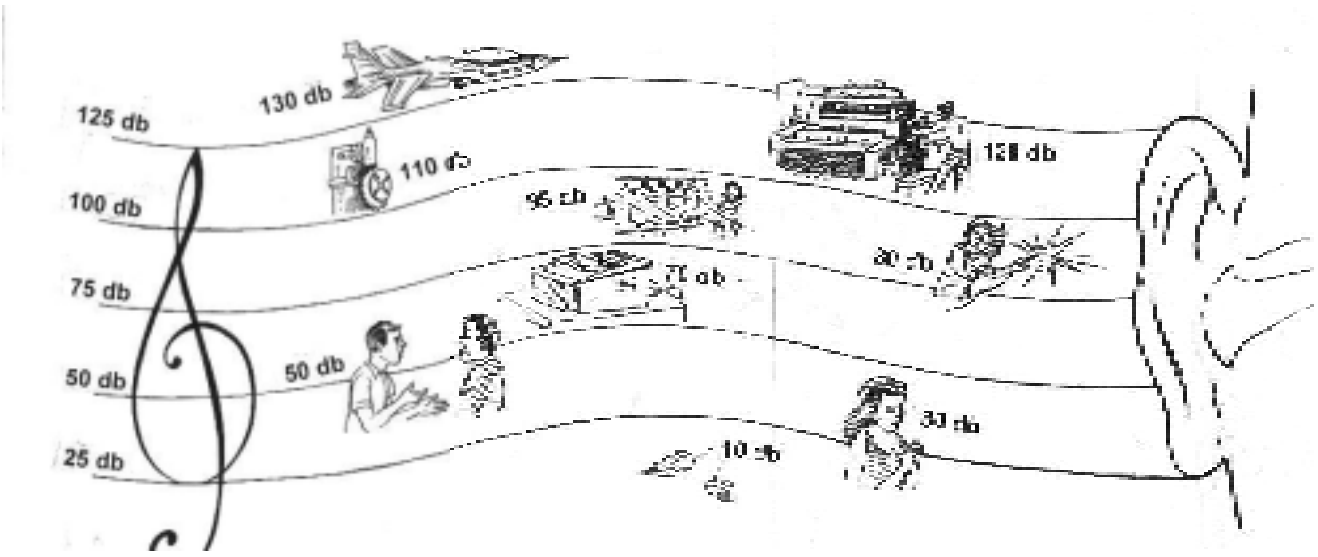
Research has shown that noise induced deafness can be caused by noise levels as low as 80dB although most countries tend to set a level of 85dB or 90dB as the maximum to which workers can be exposed over an eight-hour day. Even at these "safe" limits, women should be encouraged to wear hearing protection.

You may be thinking: "Why should I have to know about this type of stuff? It's too complicated." The reason it is important is that frequently, bosses say to workers, "I don't know why you are complaining—93dB is just a tiny bit over the legal limit of 90dB!" But in fact, 93dB means that the noise is *doubled* in intensity and *twice as likely to damage your hearing*! That is, during a four-hour period at 93dB(A) your ears would get the same dose as in an eight-hour period at 90 dB(A). Knowing a little about decibels can help you understand if managers are trying to pull the wool over your eyes (or ears).

It is also worth knowing that noise is usually not constant in intensity or frequency. Drill presses, for instance, emit a loud noise when the drill bit hits and engages the steel. Textile mills are one of the many exceptions, where the noise of the machines is usually unceasing and constant. The damage done to your ears depends on both the *loudness* of the noise, and the *duration of exposure*. This rule is based on the same *dose response* you read above and applies to all hazards found at work.

Damage = Loudness X Time

Measuring and calculating the amount of noise that crashes upon women's ears during the day is done using a machine known as a *sound*



level meter, and the result is known as **Leq** (which means the equivalent continuous noise level). The results of noise level monitoring are frequently given as **Leq** of say 87dBA (decibels), which is the dose that workers receive over an eight-hour working day.

A hand held sound meter allows you to know how loud the noise is and what 'dose' a worker gets each day.

The Weakness of Noise Level Regulations

Most noise level regulations are based on calculations which determine safe doses over an eight-hour working day. Many women are forced by the target or piecework system to work longer hours. Many are forced to work overtime. The normal number of working hours have to be taken into account when assessing the acceptable levels of noise in your workplace. Factory inspectors may assume, when measuring noise, that you work eight hours, and not take into account the longer hours of work. It is very important that you tell the inspector if you routinely work longer than eight hours per day (even if you are threatened by the bosses who may not want the authorities to know you are working extra hours).

Knowing about these technical issues helps you to understand reports from labour inspectors and trade union officials who may have equipment which allows them to accurately measure noise levels in your workplace. Sometimes, technical reports look confusing if you are not familiar with the terms and how to interpret them. Male managers and labour inspectors, too, often rely on the misconception that women do not know about, or are not interested in, technical matters. Knowing the language of noise and being able to question and discuss the results increases women's bargaining position.

Even without fancy measuring equipment, you know that noise is too loud if you have to shout to talk with another person who is two-arm-lengths away. You need to alert the other women workers to the fact that their hearing is at risk and that the enterprise managers should immediately invite a formal noise survey.

Some Decibel Equivalents for Common Sources of Noise

Decibels	Source of Noise
0	a noise just loud enough to hear (pin drop)
10	leaves rustling
20	very quiet room
30	quiet speech (prayers)
40	quiet office
50	normal conversation at 3 feet (one-arm-length)
60	shop
70	photocopy machine
80	traffic, welding, small garment factory
90	lathes, food processing factory
95	textile mill, machine shop or metal fabrication factory
100	pneumatic drill, chain saws, metal presses and moulds
110	wood planer, metal grinding machine
120	nail or rivet gun, machine room
130	jet engine, pressure riveting, iron forging

Other Health Related Effects of Noise

Excessive noise has been associated with stress, headaches and most recently, is thought to be associated with miscarriage. Research has shown that women exposed to loud noise at work experience high blood pressure, muscle tension and digestive problems.

Women working in noisy places report feeling tight, tense and dizzy, feeling out of touch with their bodies, and being disoriented. Research has shown that noise also inhibits our ability to concentrate and calculate. All these factors interfere with productivity and quality of production, a fact that can be used to negotiate with management.

All this can be said to provide a good case for the control of noise at work.

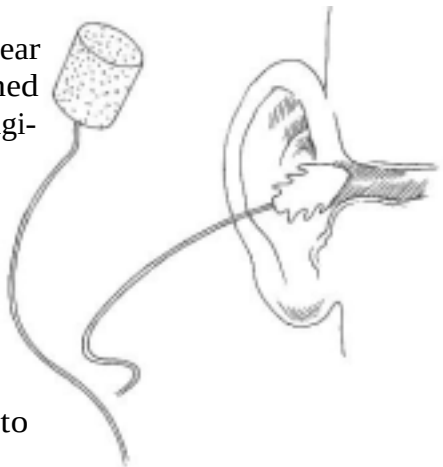
What Can be Done About Noise at Work?

The first thing you need to do is to familiarise yourself with the regulations governing noise in your country or province. Noise regulations will tell you the legal limits to which companies have to comply. A copy of these regulations should be available through the Department of Labour, or through the trade union which covers workers in your industrial sector. If these regulations do not exist in your country, refer to the regulations at the back of this book as a guide.

The second thing is to remember the fundamental principles underpinning occupational health practice:

Priority should be given to changing the design or substituting safe alternatives before forcing workers to wear protective clothing or equipment.

Most managers will ask women to wear ear plugs or muffs if they are concerned about noise rather than review the engineering and maintenance procedures.



The third thing to do is to request a review of all workers' hearing capacity by a qualified practitioner. The test is called *audiometric testing* and most Departments of Labour or Health have such services available. Some even have mobile vans that can travel to your workplace.

During this test, a technician will ask the women to enter a soundproof booth and to put on a pair of ear muffs. Through these muffs, they will play a series of sounds of varying pitch and the workers will be asked to signal when they hear the noise. The results are then put onto a chart which clearly shows if a woman has suffered any loss of hearing due to work. If this is the case, the woman needs to file for workers' compensation claim. As in almost all countries, industrial deafness is a compensable disability.

This test should be administered every year to workers in enterprises where noise levels are thought or found to be excessive. Most

To test if ear plugs are working well, try this:

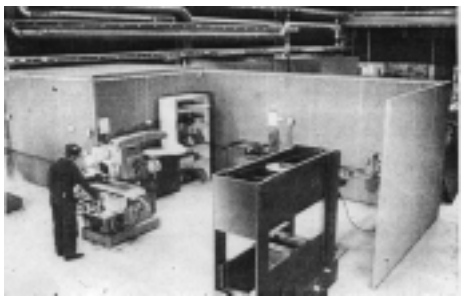
1. Insert one ear plug leaving the other ear free
2. Say Aaaah! (like at the doctor's)
3. If the ear plug is doing its job, the sound of the Aaaah will be louder in the plugged ear than in the free ear

occupational health regulations stipulate that workers have a right to such testing. If not, your trade union should fight for this right as they are fighting for your right to enjoy your life after work and your right to communicate with the world.

Next, suggest that the following options are open to management:

1. Improve the maintenance procedures. In many cases, excessive noise is caused by poor maintenance and consequently, by vibration or metal rubbing or clanking on metal. Unbalanced wheels or gears will cause a machine to rattle and to be noisier than normal. Wear and tear may have worn away normal sound insulating materials such as rubber or cork. Second-hand tyres are a good cheap source of rubber which can be placed under noisy machines to dampen the vibration.

2. Isolate the noisy machines by building sound absorbing walls around them. Cheap plywood walls can be covered with second-hand packing materials or layers of egg cartons (of the *papier mache* variety). A really effective wall should be 50/100 mm thick and should be filled with rock wool sandwiched between steel mesh. Similarly, old cloth can be shredded and mixed with paper to make a mulch which when mixed with glue can be applied to walls to soak up noise. Women can then be given hearing protection when they have to attend to the machine rather than everyone having to wear hearing protection to combat the noise from one or two loud machines.



Acoustic screens (courtesy of Ecomax Acoustics Ltd.)

Acoustic absorption treatment showing suspended panels

Noise enclosure with access doors removed (courtesy of Ecomax Acoustics Ltd.)

3. Some particular operations are very noisy, for instance, the use of compressed air to clean heddles (the thin wire loops that carry the warp thread) in weaving machines. By shielding that operation or increasing the width of the outlet, the noise levels can be markedly reduced. Sometimes it is easy to insulate the noisy part by enclosing it in a box or for instance, changing the method of movement from metal gears to rubber belt drive wheels. Request the assistance of the plant engineers once you have made an inventory of all the sources of noise. *It is easier for you to win the battle if you provide management with a carefully defined set of problems and possible solutions rather than merely complaining broadly about the machines.*

4. Insist that management institute a hearing protection program by:

* Educating the workers about the risks of noise. Hearing loss is a subtle and long term process. It is often hard for workers to understand why they have to wear plugs or muffs if they do not sense any change in their hearing right now. Convincing peo-

ple that *they have to act now* to save something in the future is hard, particularly in developing countries where most women live on a day-to-day basis. This involves a concept of the future which many women simply may not have—as for many poor people, the future is a luxury that they may never feast upon. But with economic change comes changes in people's expectations. So, start education as soon as possible.

* Making sure that all those who work in noisy areas have annual hearing tests.
* Giving hearing protection in the form of ear plugs or muffs to workers in noisy areas. (Plugs will have to be replaced after every two days, or at least be washed to prevent infection. Muffs also have to be cleaned).
* Placing signposts on all noisy areas stating that hearing protection must be worn and authorising supervisors to strictly enforce this rule.
* Compensating workers for existing hearing loss.
* Making all attempts to "buy quiet"—that is, replacing all redundant or out of date machines with ones that make less noise.
* Embark on a program of reducing the major sources of noise by engineering or design modifications.
* Regularly maintain machines with emphasis on noise reduction.

Finally, like all issues in occupational health, hearing conservation is:

Everyone's responsibility. Once you lose it, it is gone forever. Care for your hearing today—it is an investment on your future.

Ergonomics: Work Design

"Day in and day out I do the same thing. I get so bored—there's no challenge any more. I have to daydream to help pass the time. But lately, the pain in my arms and shoulders will not let me dream too much."—Korean process line worker

"Oh, my aching back!" We often think or say this after we get up from our work, whether it be the kitchen stove, desk, loom or assembly line.

This very clumsy and ugly word *ergonomics* conceals concepts and ideas that are of great importance to women. This is because a lot of work that we do at home or in the

Having most components and tools easily available enables you to save effort and work in a more relaxed way. It also keeps tools out of harm's way.

workplace is made more difficult by poor attention to design.

How many poor women, for instance, still place their stoves on the floor at home? Do you know that by putting it on a bench at waist height, you can save a lot of energy and effort, and keep dishes and utensils cleaner? If they have little money, an old wooden crate filled with packed earth can make a good low-cost and fireproof cooking top.

More particularly, how many women perform rapid repetitive movements all day in the factory, the components swimming before their eyes, the work leaving them feeling stiff and sore at the end of the day?

This section of Chapter 3 reviews the principles of work design, and can be applied just as well at home as in the factory.

The aim of ergonomics is to minimise the mismatch between the abilities that we as humans have and the requirements of the jobs that we all have to do. For instance, as I sit here typing these words into my computer, the monitor is sitting on a box to ensure that I don't have to strain my neck by looking up all the time. The screen is turned away from the window so I don't have to try to see past reflected glare, and the lights are above and a little to the left of me, so shadows don't fall on any books that I am using to prod my failing memory. Simple things; but they all save effort and enable me to work better and with less fatigue.

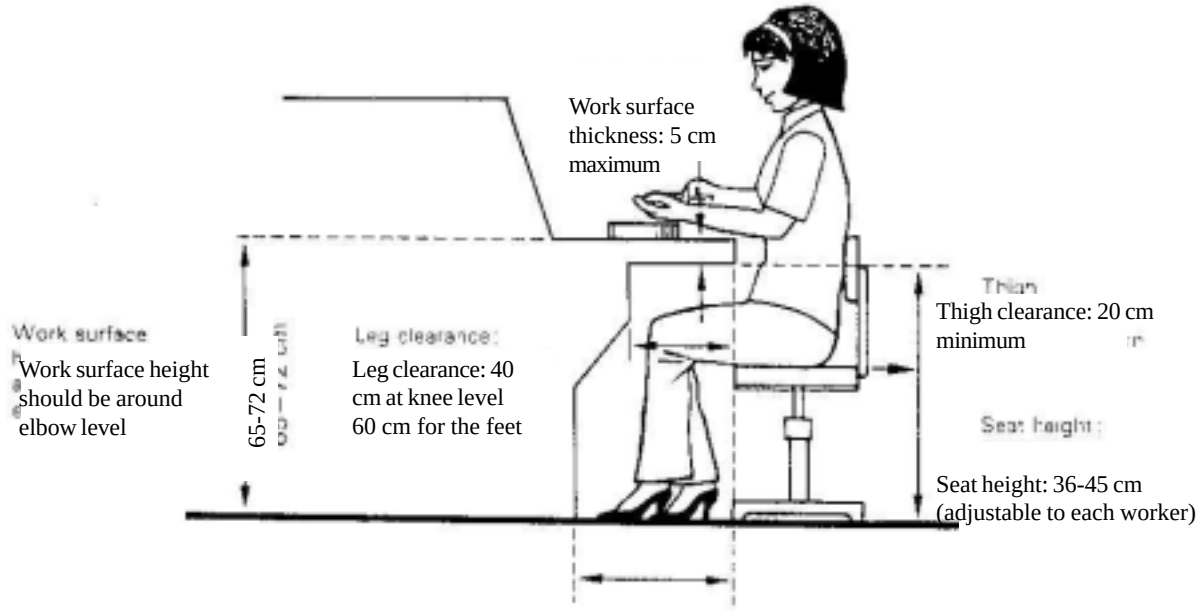
To understand why ergonomics is important, we need to have some idea of how our bodies work.

The Machine Called Human

Every movement we make involves a complex series of activities in the body. Look at how you are holding this book and be aware of the action. Become conscious of how your fingers and arms work together to support the weight and turn the pages. Notice how you don't crush the book or drop it but just hold it with the right amount of muscle pressure. Now be aware of how you are sitting, which muscles are straining to support your back? Focus on how your legs are arranged beneath you, if they are comfortably resting on the floor or if they are curled up beneath you and cause your spine to twist. Focus on whether or not you feel comfortable. What, for you, are the components of a comfortable, relaxed position?

Notice, too, the structure of your hands, how the taut strings on the back of the hand show up like eels when you move your fingers. Look at the inside of your wrist and at how the blood vessels and cords, known as tendons, push up into the hand. Pull your thumb across the wrist and feel the structures underneath.

Our bodies are truly remarkable things. They are well-designed and precise. Look at your hands again. Muscles which make the fingers move are found in the lower part of the arm, the action in the finger is caused by the strings (tendons) that you can see on the back of your hand. The tendons can make the hand clench. If the muscles controlling finger and wrist movements were placed in the hand, we would not have the same refined and elegant structures that we now have, but instead big clumsy collections of fat sausages on the ends of



Recommended dimensions for most seated tasks

our arms. As one set of muscles contracts to make a movement, the others relax—feel this in your upper arm as you bend and unbend your elbow. This corresponding action allows blood to enter the loose, relaxed muscles, bringing food in the form of sugars and oxygen.

Our bodies, being chemically driven machines, also produce a lot of waste materials. When muscles work, they create what is called lactic acid. If the muscles work far a long time without a break, lactic acid builds up in the muscles and makes them ache. This is because the muscles have been working far too long without the relaxation needed to allow the blood to enter, bring food and carry away the garbage.

When we work at a weaving machine, for instance, and have to reach across to fix the moving parts, or we have to paint a car body that is above our shoulders in height, our shoulders might begin to complain. Similarly, if we work all day sitting on a chair that has no back support, it is likely that our back will also begin to complain. This is because the muscles are working hard without being given an opportunity to relax. No relaxation, no nourishment and no garbage collection! All these equal pain, discomfort and rapid fatigue. *Having workers who are perpetually tired and in pain does not make good sense for management.*

Sometimes we may be working in a relaxed position but due to stress or loud noise, our body becomes very tight—we may not even notice this tension. This brings about the same response as when the muscles work hard. When we are tense, the muscles in our body become tight as we "armour" ourselves against the world. Tension headaches are a very good example of what happens when the body gets tight.

So, one of the major aims of ergonomics is to allow the person to work most effectively in a way that is relaxed, and in a way that makes best use of the body's abilities. This includes their ability to see, hear,

respond appropriately and to be part of a social work group. Paying attention to work design or ergonomic principles increases production, reduces fatigue and injury, and improves morale. These pluses are important bargaining tools.

How Can I talk About These Things if I Don't Know About Them?

Most workers are experts on their own tasks. It doesn't take long before they begin to know it intimately. Tools become old friends or enemies. If asked what needs to be done to make work more comfortable, most women could easily come up with answers like:

"The handle on the screwdriver needs to be made bigger so my hand is not so bunched up."

"This chair needs to be higher so I can work without my arms in the air."

"If they improved the lighting, I wouldn't have to lean so far forward to see what I am doing and it wouldn't hurt my back so much."

"If I could store the components I needed in self-feeding boxes in a semi-circle at the edge of the table, I wouldn't have to reach so far and get sore shoulders."

All these answers reveal an innate understanding of ergonomics, which is after all simply common sense mixed up with a little science.

Handy Principles

However, some handy principles apply and will help you take a critical look at the work performed by you and your friends:

1. *Bodies are not designed to work flat out all day*. People need breaks, variation in work rhythm and speed. People are not machines—you cannot turn them on, leave them to run all day and then turn them off. Time is needed at the beginning and end of each day, *and* at the beginning and end of each break to warm up and cool down. Like industrial athletes, women need to take it slowly at first and then gradually work up to speed, then reduce output over time before breaks or going home. This is particularly important if they are doing fast, repetitive assembly work with a conveyor-fed system.

2. *Bodies are made to move rhythmically and smoothly, and to mix fine and coarse movements—not to perform the same rapid repetitive movements in a fixed position.* To design work that demands this from workers is to induce rapid fatigue and loss of productivity. *It simply does not make economic sense to design work for people that should be done by machines.* Bodies are designed to walk, sit and stand, not to sit all day, stand all day or walk all day. For instance, the circulatory system in the legs depends on muscle movement in the legs to return blood to the heart. Sitting all day, particularly without a foot rest, makes it hard for this to happen as circulation cannot be helped by the muscle pumps in the legs. Ankles swell and begin to ache. Pregnant women should be given a mix of work to prevent this problem as this is more acute in pregnant workers.

Rapid and repetitive work is essentially boring, and women can lose concentration simply because they are not challenged by the task. Lapses of concentration can be dangerous in poorly designed factories which contain fast moving unguarded machinery. Many men believe that women are particularly good at fine manipulative tasks that require no attention or capacity to think. Consequently, women have been given these jobs, which further strengthened the stereotype. Separating the "thinking and doing" jobs serves to rob the enterprise of the considerable intellectual and creative skills of women. It also means that women's work is the lowest paying and most dreary and, in the case of muscle strain injuries, the most harmful. In effect, everyone loses: industry loses the skills of women due to their blind adherence to male stereotypes, and women lose their body's grace, strength and health.

Work should be varied. Women captured by target-oriented payment systems are often fearful of mixing tasks in case they lose money. Target systems are a major health hazard as they encourage women to work too fast and too hard, ignoring signals from their bodies. *Target systems should be banned in favour of payment increments which recognise and reward skill and experience.*

3. *Work which requires the arms to be held at or above shoulder height, or in fixed positions should be redesigned to allow the woman to work in a relaxed posture*. For instance, a car wheel assembly which passes overhead to be painted can be rotated through 45 degrees to slide along on its side. By dropping the wheel assembly lower, the woman operating the paint spray can work at waist height, not overhead.

4. *Loads should not be lifted from floor level.* All loads to be carried should be placed on pallets (wooden shelves) set at least 15 centimetres above the floor. By placing the loads on raised surfaces, back strain can be significantly reduced with very little cost.

5. *Loads should be carried close to the body*. Large unstable loads should be handled in parts or by several people. If in doubt, GET HELP. Do not attempt to lift heavy loads on your own. Pregnant women should not handle heavy loads as their backs and pelvis are unstable if they are in the later stages of pregnancy. The best form of handling is with carts or with trolleys and wheels. Heavy (or unstable) loads should not be carried for long distances.

Adjustable chairs and stools

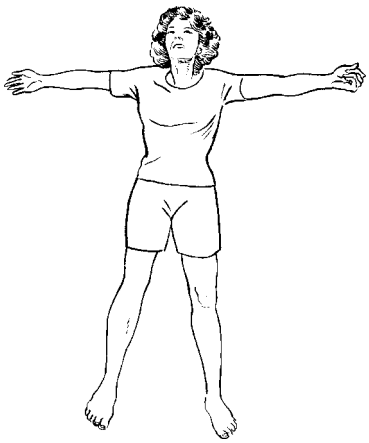
6. *Where possible*[3] *, work chairs should be stable, adjustable, have a back rest and allow the woman to place her feet flat on the floor*. If the task requires the body to move side to side (for instance, removing plastic buckets from the moulding machine and stacking them on the floor next to the chair), make sure that the chair swivels to reduce strain on the woman's lower back. Back rests should support the lower

[3]There are very few jobs where chairs having back rests and adjustability are not advisable. In fact I cannot think of any!

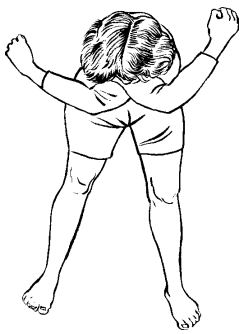
Exercises for Back, Shoulders, Arms and Hands

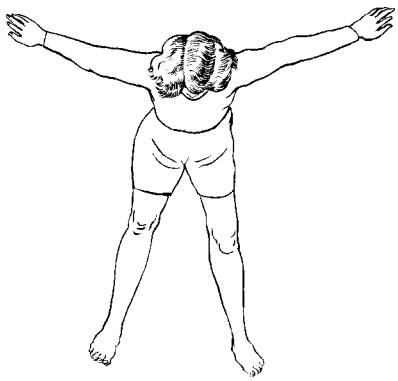
Series 1 for Shoulder Pain to Release Muscle Tension

Most work are performed sitting or standing, bent forwards. The aim of this series of exercises is to open the body and push back the arms so that stretched and relaxed swinging movements can be introduced to the upper body.

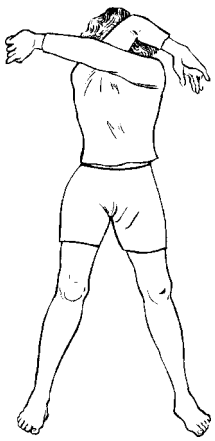


1. Stand straight and open your arms wide slowly and gently push back until you feel the stretch from the chest to the finger tips. Hold for three counts, release and repeat three times.

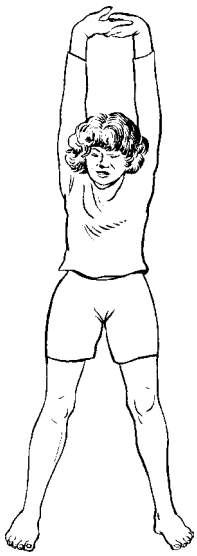




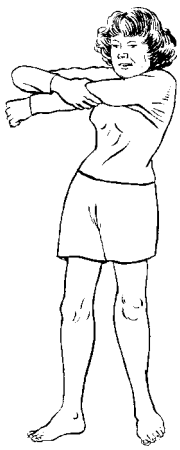
2. & 3. Bend forward and allow your arms to swing down and out. Do this several times until your shoulders feel relaxed. You may hear cracking or crunching noises. Don't be alarmed unless it hurts. If it does so, stop!



4. Stand and swing your arms loosely across the chest



5. Stretch your arms over the head while lacing the fingers together. Remember to breathe deeply—filling your lungs as much as you can—breathing out when you let your arms down. Repeat three times.



6. Holding your upper left arm with the right hand, gently pull the arm to your chest until you feel tension in your shoulder and upper back. Do this with your upper right arm also. Repeat three times.

Series 2 for the Hands and Wrists

These exercises are for hand and wrist flexibility.

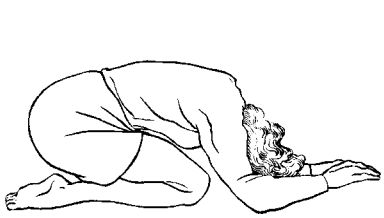
1. Put your hands together in "prayer" position.

2. Gradually push to the left and then to the right—feeling the stretch in the fingers and lower arms.

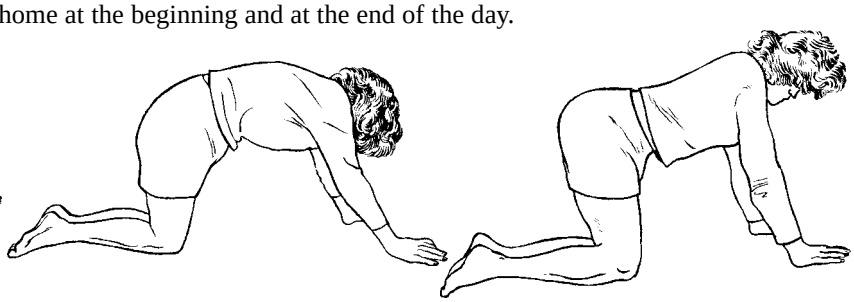
3. Then hold your hands in front of the body and loosely shake your hands. You can do this also when the arms are hanging loosely at your sides. Remember to stop if there is any pain.

Series 3 for Lower Back Pain

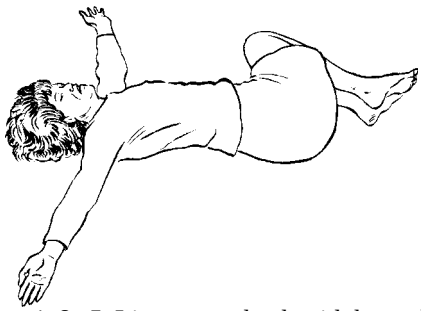
These are best done at home at the beginning and at the end of the day.



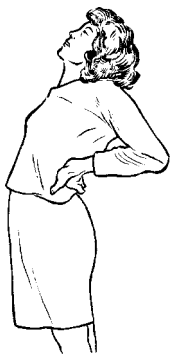
1. Kneel on the floor and drop forward so your chest is on your knees and your arms slightly extended. Take a deep breath as you go down into the forward lying position. Breathe out when you are down, breathe in again as you relax. Count to five slowly and breathe in again as you sit up.



2. & 3. Kneel and hunch your back up like a happy cat. Let it drop down like a saddle back donkey. Breathe in as you go up—out as you let it drop. Repeat this exercise five times.



4. & 5. Lie on your back with knees bent. Keeping your shoulders on the floor, roll your knees to the left and to the right. The movement should be from the waist. Again, if it hurts, stop!

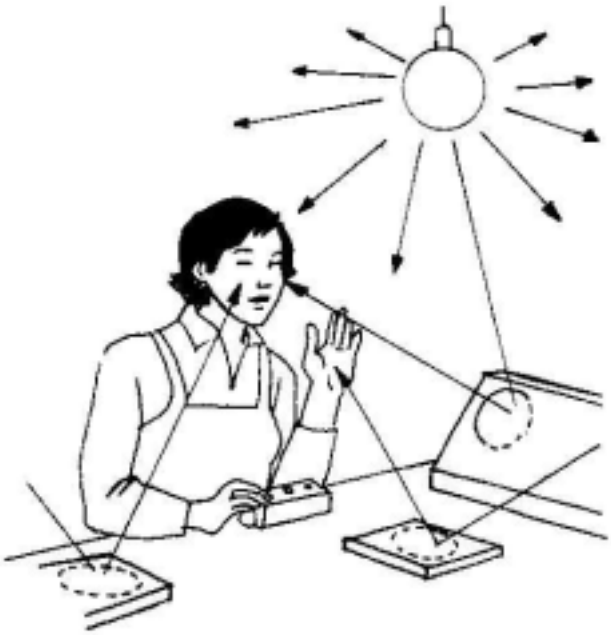


6. Stand and put your hands on your upper bottom. Bend backward as far as you can. Try and look at the same spot on the ceiling each day, then gradually move past it. Breathe in and out deeply as you return to the standing position. Do this three times. Finally, do Exercise 1 again to relax.

For process workers, do these exercises at least twice a day. Do all to below limit of pain. Repeat each exercise five times. Do not strain or push if it hurts.

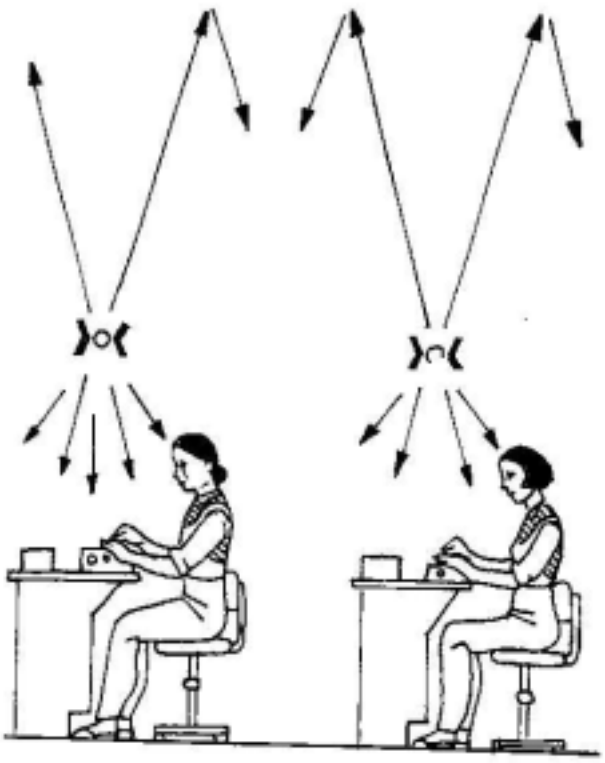
Good Lighting is Part of Good Ergonomics

Sharp shadows make it difficult to work



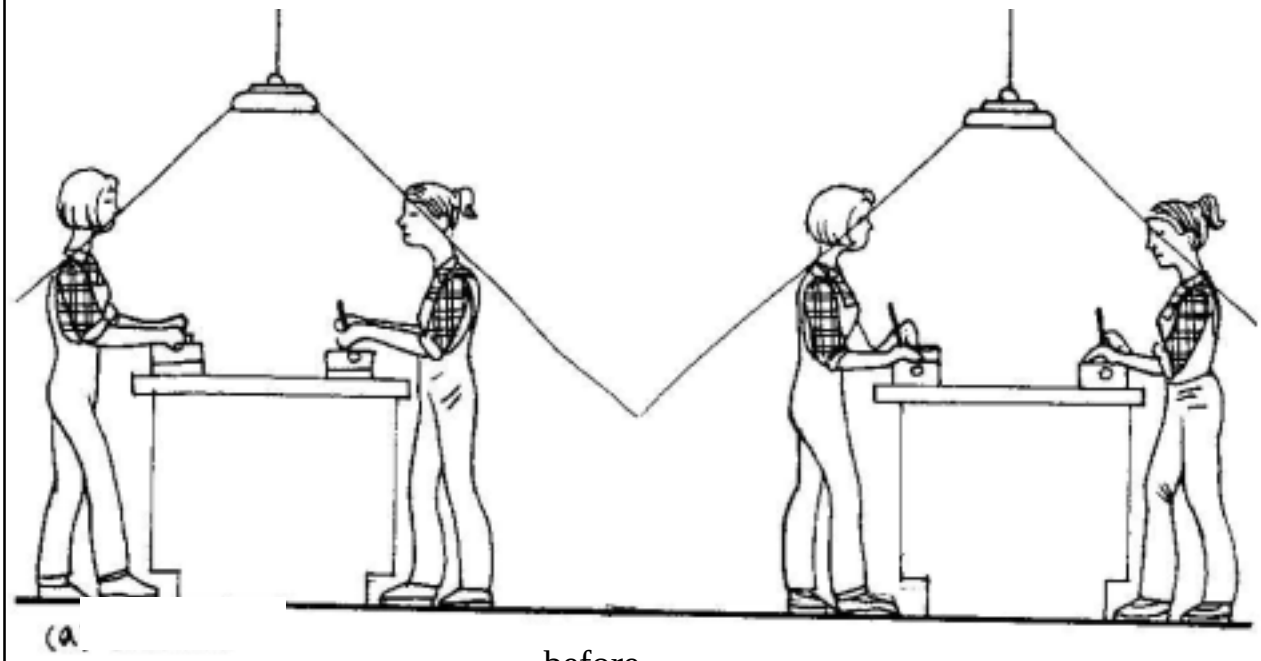
Reflected (indirect) glare

Remember to reduce glare!

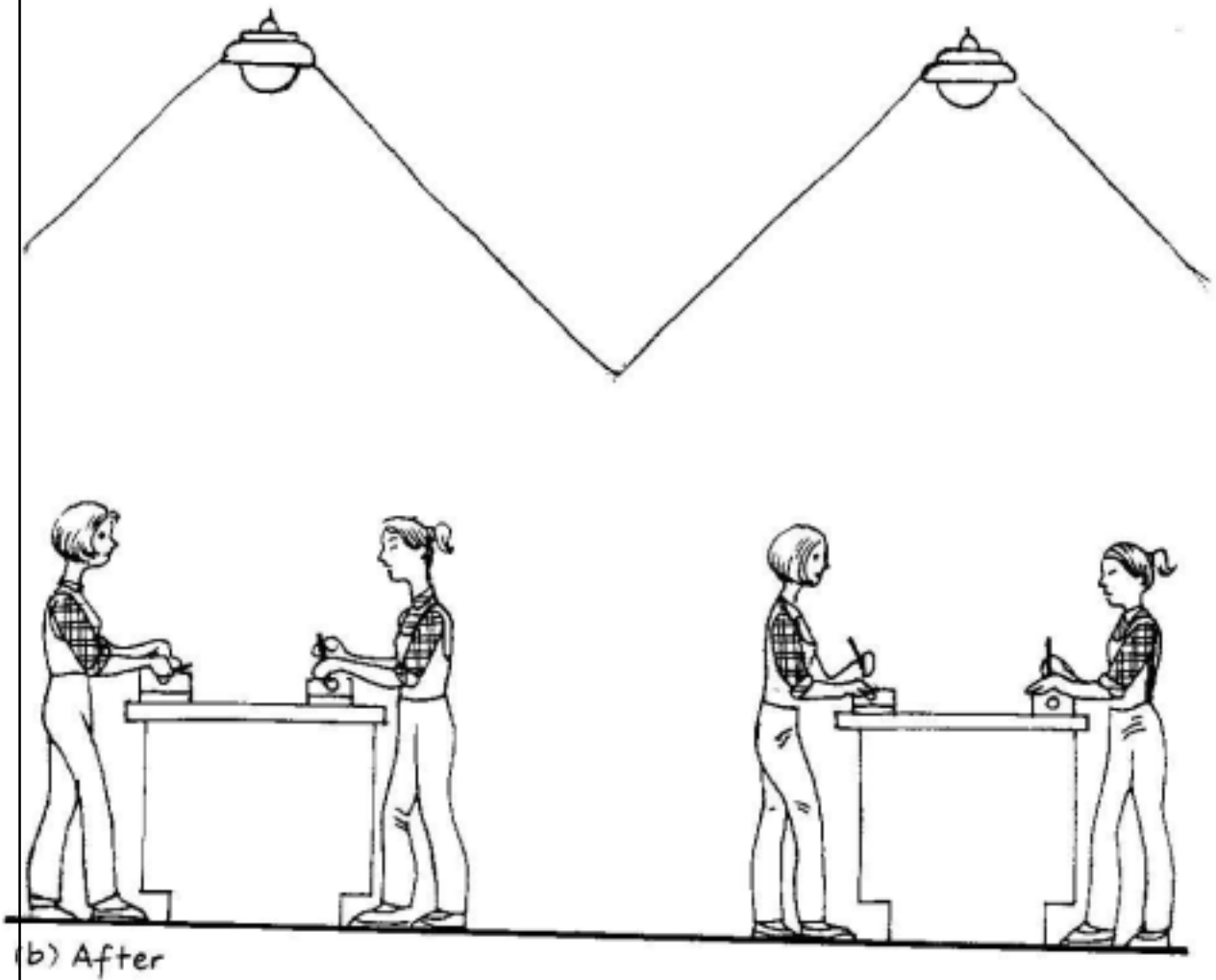


A mixture of direct and reflected light
provides the best visibility

Higher lighting gives better dispersion



before



after

part of the back where it curves inwards. This is the point at which the structure of the back is most vulnerable.

7. *If work has to be performed standing, a foot rest in the shape of a T-Bar should be provided to give postural variation.*

8. *Rapid repetitive work should be broken up with periods of exercise which allow the body to "open"* (see illustration on next page) *and regain relaxation.* Rest breaks should be taken for three minutes every hour. Better still, workers should be offered the opportunity to perform varying tasks. For instance, having to walk to a hopper to fetch or store components gives an opportunity to relax and change movements.

9. *Noise levels should be kept to a minimum.* Vibration coming from machinery or through workers' seating should also be minimised.

10. *Lighting levels and arrangements should allow the worker to see well without glare, and prevent them from working in their own shadow.* 11. *Legs are stronger than arms. Some controls that require a lot of arm strength should be transferred to foot controls.* Similarly, pushing is stronger than pulling. So, pushing a tight lever is easier to do than pulling it. Increasing the length of levers can add to what is known as *mechanical advantage*: that is, it naturally reduces the amount of force you require to achieve an action by amplifying the leverage.

12. *Make sure all workers can see the controls and know what all the dials and needles mean.* Stop buttons should be accessible and colour coded (preferably in red which is the international code for danger).

13. *Heavy things should not be placed on the top shelves.* Heavy things should not be stacked at height or in towers of over five parts (for instance, five boxes of nails, or five bales of cotton).

14. *Hand tools should be regularly maintained and designed to minimise the strain on the hands and arms.*

Globally, the greatest number of workplace injuries are those in the back, neck and upper limbs. These injuries are often long-term, cause a lot of pain and suffering, and interfere with a woman's abilities to enjoy her family. Women with upper limb injuries, for instance, can lose strength in their hands and arms. This can make it difficult to cook, handle heavy pots, chop firewood or wash clothes. In extreme cases, women have reported that the pain is so great that they are unable to make love or do up their bra straps!

Muscle injuries cause loss of productivity, increase absenteeism and lead to a loss of personal dignity. Highly trained and speedy workers are often those who are the first to succumb to muscle strain injuries as they tend to work harder and don't take breaks.

Symptoms of Muscle Strain Injuries

Muscle strain injuries show themselves in many ways: pain, redness and swelling of the joints, limitations on movement (particularly extreme movement), stiffness, a feeling like there are pebbles or sand in the joints or in the tendons, a grabbing sensation at the back of the hands, burning pains, weakness, pins and needles, and the involuntary curling of fingers into the palm.

Back injuries are signalled by shooting pains down the back of

The Hidden Injury

Sushie Narayan, 36, contracted Repetitive Strain Injury (RSI) while working as a receptionist in a state government department. Today, nearly seven years later, she is unemployed, looking for work and still coming to terms with the impact of her injury.

September 1989: "I was working full-time as a secretary in the public service at the Department of Industry, Technology and Resources.

"I was hired in 1988. By mid-1989 I began having problems. It was hectic and there had been a lot of staff changes. It was stressful because the new staff didn't quite know what was what and I had to help them to settle in and some of them were rather demanding.

"I worked at the front reception and was also doing a lot of word processing and clerical work. At one stage the workload got pretty heavy and I remember telling that they should send some of it out especially if there was a deadline to meet. I remember working back late for up to two hours sometimes."

She said about 80 percent of the workload was typing.

"I was fast. I never timed the speed but I used to be able to just whip things off. I thought that I was handling everything quite well. I was able to type fast and I was efficient—a typical RSI candidate."

By late 1989 she suddenly started getting pain in her hand.

"In the beginning it was just like the odd pain. One day I noticed a weakness developing in the wrist and I began to notice that my speed was falling and my coordination wasn't quite there. I got worried and confided to one of the ladies there. She said it sounded like I was getting RSI."

"I didn't even know what RSI was. She got in touch with the occupational health and safety nurse and I told my boss. The nurse saw me and diagnosed RSI and she told me to go and see the doctor. I was told to reduce my typing and check the ergonomics."

Narayan said there was ergonomic furniture at work but it had never been adjusted and she was never told how to sit or what height she should sit at.

"They sent someone around to show me but at that stage I continued to work. But I shouldn't have been doing any typing at that stage. They said reduce it but how could I when I was always under pressure. I remember at one stage I was in quite a bit of pain and I had to sit down and type for my boss. I found it hard to say no and that was part of the problem."

"I just got worse and worse and started to take more and more time off work and they had to bring in temps [temporary] to cover for me. I had taken some time off and they had called me in. I thought they were going to help me and put me on part-time but they said they would have to let me go and when they told me the news I was devastated. It was terrible and I just cried and cried all the way home on the train."

Narayan kept in touch with the nurse who helped her with WorkCare stuff.

"For six months after that I was just a mess. I couldn't carry groceries or anything heavy and I couldn't even hold a knife and fork. I couldn't cut things and sometimes I would be doing something and then all of a sudden my hand and wrist would go limp. My hand just looked like dead meat," Narayan said.

"The nature of the injury is such that people

don't believe you and they think you will get better and they think you are malingering after a while. You know you are feeling weak and you know you can't do certain things but other people see you as a normal person."

Narayan felt very isolated but later joined WRIST—a support group for people with RSI. She said that was helpful because she met some other people her age and in the same situation.

"I really needed that support because I was so isolated being out of work and not sure where my future was going. And I just wasn't getting better. This takes a long time to get better."

"I didn't start any therapy until about six months after I lost my job and I realised that I wasn't getting better. So through the support group I realised the need to learn to manage stress. I had to exercise and it was really like a lifestyle change."

She said it was probably about three years before she started to notice an improvement.

"I was on WorkCare for a long time and had regular check-ups and the doctors were horrible."

"I had a lawyer who represented me for a lump sum claim. After I had paid the fee I walked away with $1,000. They said I could refuse it but if I lost I would have to pay all the fees. I just told them to forget it and took the $1,000 and left."

"My doctor said I could apply for sickness benefits but I just got sick of being sick and feeling I was an injured and useless person."

Narayan went on the JobSearch allowance and started to look for a job. However, once she started to look for a job she realised that after being out of the workforce for so long she had really lost a lot of confidence.

"I also had counselling that took up two years of my time and it was very in-depth stuff. I also had massage and did yoga and other types of therapy but I don't think that really made any difference until I saw a chiropractor. That is when I noticed things started to improve."

She said the problem with the WorkCare system was that it was more focused on getting her back to work as soon as possible. "I knew I couldn't go back to the same kind of work and it was better that I didn't. The emphasis should have been on changing career but to do that I need to study for a long time."

"But WorkCare isn't willing to support you to study for a long time and you never know when they are going to cut your payments. So I was under a lot of pressure. I just couldn't make a long-term goal for myself. I wasted a lot of time sitting around worrying."

Narayan said she handles stress a lot better now. "When I was on WorkCare I was lost and drifting and the system was pushing me along. I felt like I didn't have the energy after all of that. I just felt like a wreck. And RSI is a stress-related condition and to get better you need to be able to allay as much stress as possible."

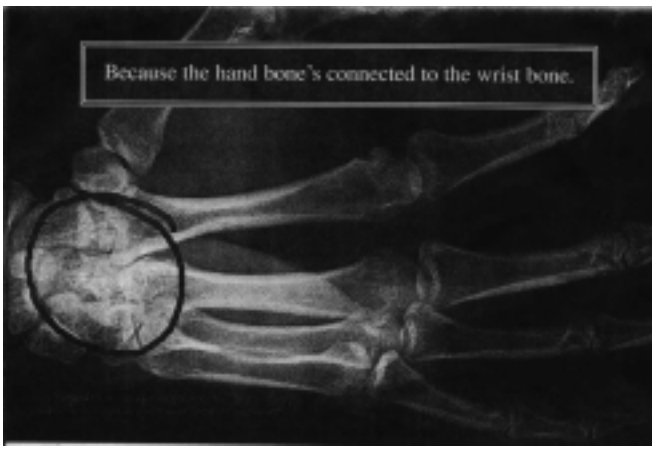
Though improving slowly, she still feels occasional pain.

"If I carry something heavy, or like the other day I was playing with some kids and I noticed the pain straight away."

Source: *Australian Safety News*, July 1996

the legs and inability to straighten up (stand up), as well as sheer pain and inability to move smoothly. The pain may affect the hips and result in unbalanced walking.

What Causes These Injuries?



The wrist is made up of lots of small bones as you can see from this x-ray photo. This allows the maximum amount of movement in all directions—important in dancing as well as work. Sometimes this area gets sore and hot when used repetitively without a break.

To understand why these injuries occur, we need to know a little about how the body is structured. As we saw above from looking at our own hands, the muscles in the arms operate the fingers by the use of long fibrous strands called tendons. These tendons run inside water-filled sheaths. Our joints are also surrounded by capsules that contain water, which help make the joint work smoothly and effortlessly.

When the muscles relax, fresh blood is able to enter, bringing oxygen and sugar as food, and carrying away waste that has accumulated. In this way, the fluid in the tendon sheaths is renewed and refreshed. If the muscles work without rest, the muscles become starved of nutrients and become weighed down by waste. In addition, the fluid inside the tendon sheaths becomes thick and sticky. That is why joints "creak" and tendons in the wrist and hand feel like they "grab."

Keyboard work, using fine repetitive finger movements and requiring other parts of the arms to be still, is a source of lots of strain injuries

If the task demands forceful and extreme hand movements, such as stapling or screwing jar tops onto containers, the fibrous band that encloses the veins, nerves and tendons on the front of the wrist becomes thickened. Because this band swells, it puts more pressure on nerves underneath, which respond by feeling like ants are crawling on your fingers (in fact, Indonesians call it *kesemutan-semut* meaning ant). The pressure of this band will eventually force the fingers to curl unless the task is changed and the tissues are given time to return to normal. In extreme cases, a woman worker may need an operation to release the swollen fibrous band.[4]

The names given to some of these conditions are things like tenosynovitis (inflammation of the tendons and fluid filled sheaths), bursitis (inflammation of the joint capsule and the area around the joint), carpal tunnel syndrome (thickening of the band of tissue in the wrist), tendonitis (inflammation of the tendons), myalgia (muscle pain), and tension neck syndrome (accumulated stiffness in the neck causing pain and limitation of movement). (for more details see Chapter 1). These problems should not be confused with arthritic conditions. While arthritis can be made worse by working conditions, it is generally caused by other factors.

If you suffer from any of the symptoms listed above and choose to see a doctor, be sure to tell them what you do at work and for how may hours each day. If possible, demonstrate or mime

[4]This condition which is known as Carpal Tunnel Syndrome often arises more in pregnant or menopausal women, as the fibrous growth seems to be influenced by hormonal change. Before embarking on expensive (and possibly damaging) surgery, women should take care to make sure there are no other solutions (like work reform and job change) and for the hormones to settle, which may enable the condition to recover on its own.

what you do and the actions you perform. By doing this, you will make the link in the doctor's mind between work and the types of symptoms you are presenting to her or him. If a group of workers is suffering the same sorts of complaints, you could think about asking the doctor to write letters suggesting that the work requires reduction in pace or reorganisation to introduce job rotation or multiskilling. If this approach threatens your pay rates, then you, individually or as a group need to decide on your priorities and if you want to risk long term damage to your health.

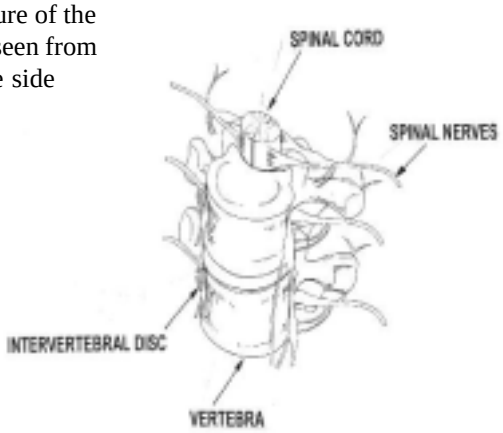
Structure of the spine seen from the front

Basic Backs

Our backs also have a complex and specialised structure. If you reach behind, you will feel the knobs of the building blocks that make up your spine. Inside the spine is found the second most important nerve centre of the body, the spinal cord, which rises to join the brain. Between each of the bones that make up the back are spongy discs which cushion movements and give the spine its great flexibility (see illustration).

A mass of muscles holds the body erect. These muscles are attached to the spine and to the rib cage and pelvis. To provide additional strength, a strong wall of ligaments (a particularly strong form of fibrous tissue) is found at the front and the back of the spine binding it all together. One of the body's only design faults is that the ligaments found on the inside of the spine tend to end just above the small of the

Structure of the spine seen from the side



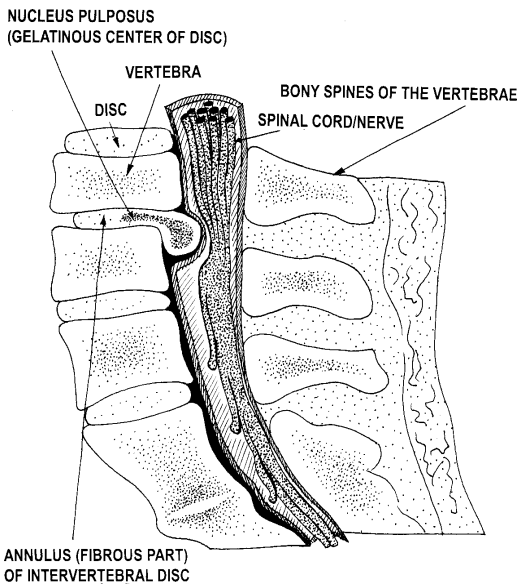
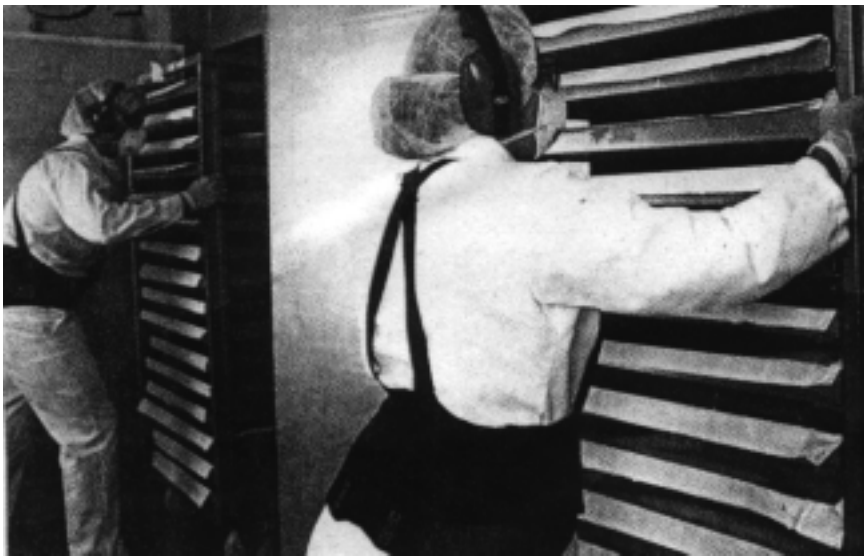


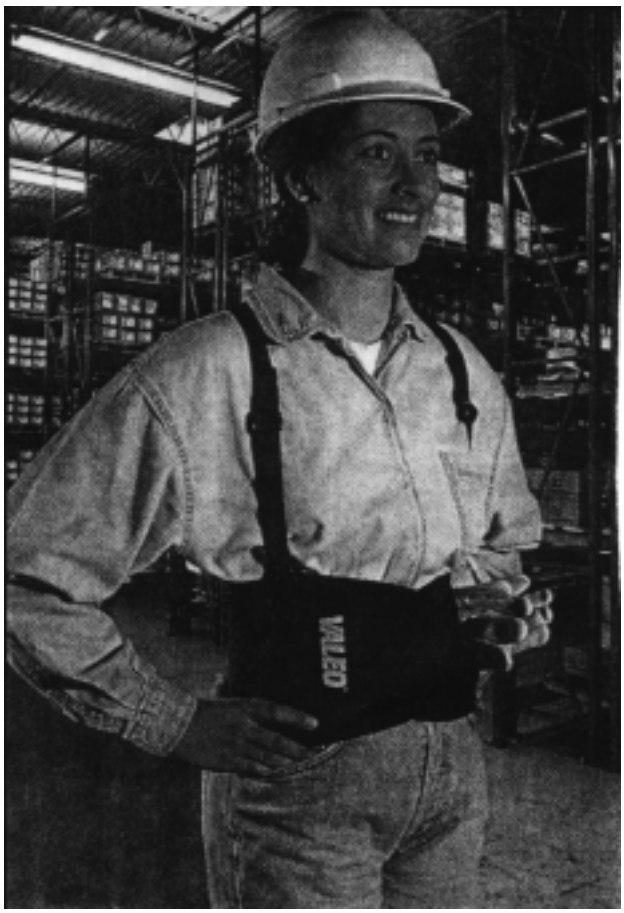
Diagram showing 'slipped disc' pushing on nerve bundle which is what causes the pain

Back Belts

There has been some argument recently about the use of back belts for work that requires heavy lifting or repeated twisting.



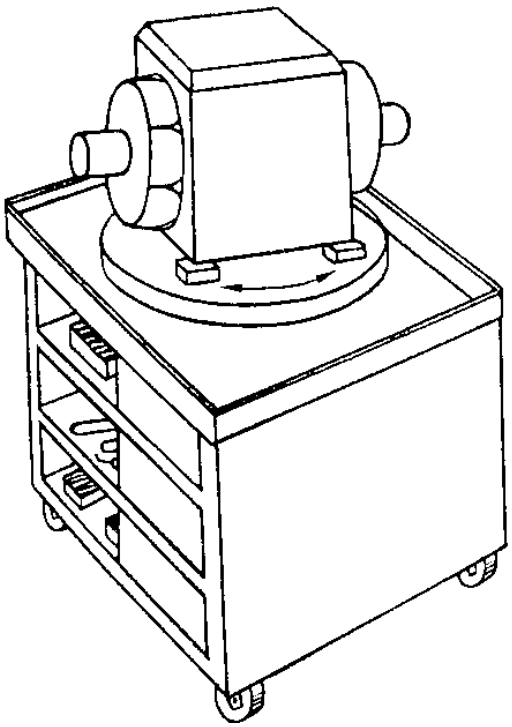
Here, women in a commercial baking enterprise wear masks, hearing protection, gloves, hair nets and back belts. They wear back belts as their work requires lifting, turning and reaching.



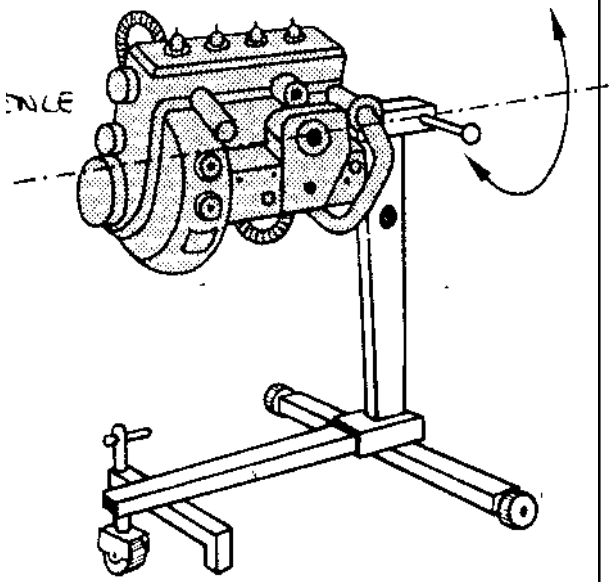
Here, a woman construction worker wears a back belt which can be integrated with a safety harness to prevent falls from heights. She would have to lift, bend and twist.

For work that needs the back to be stabilised such as repeated pushing and pulling of heavy materials, bending and twisting, back belts may be for you. Try them but remember IT IS BETTER TO REDESIGN THE WORK SO YOU DON'T NEED THEM!

Instead of back belts, think of creative solutions such as those shown here.



This is a revolving platform upon which to put the work. Instead of twisting or bending, the worker can simply spin the platform. It saves effort, time and is cheap to make. Tools can be stored underneath for convenience.



This design enables the work to turn like an animal being cooked on a spit. This reduces the need for twisting or bending and can be adjusted to suit the height of any worker whether sitting or standing.

back, which is where the majority of back movement occurs. The lack of ligaments in this area means we all have a particular vulnerability, and thus, have to be aware and take care of this wonderful gift that is our body.

The spine and the discs have no internal nerve endings, so it is not until something goes badly wrong that you feel any pain. Typically, the disc becomes gradually frayed until the gel that fills the centre of the disc pushes out from between the vertebrae, as the bony blocks are called (see drawing).

Three types of events (excluding arthritic conditions) cause the majority of back pain:

1. The spongy disc becomes worn and frayed and protrudes from between the bones until it rubs against the major nerve going to the leg.
2. The muscles in the back become strained and injured by sudden, strenuous movement.
3. Very rarely, the tendons and ligaments in the back and hips may loosen and become damaged.

Sometimes, catching falling objects can crack the bones in the

spine, badly bruise muscles and blood vessels or cause other physical damage. But these types of injury are comparatively rare.

Thus, it is important to reduce strains and stresses which may act against the body's natural rhythms and ways of working. It is important to remember that while the human body is *not* like a machine that can be turned on and left to whirr away by itself, it does share some similarities with a machine. If you run a car at high speed all the time, it will wear out faster, will need more maintenance and will use much more fuel. So it is with people. If they work hard, under stress, with time deadlines and with not enough time to let the engine "cool down," they will wear out much faster, need more medical attention, and more food to simply keep going.

Unlike machines, people have emotions and social needs. Workers respond in complex ways to environments and situations making continual decisions and judgements. For managers to treat workers like machines is not only to deny workers their humanity but also make irrational judgements about how best to use the great skills and abilities of women workers.

Nutrition at Work

In many countries of the Majority World, companies provide employees with midday meals as well as late night meals for shift workers. In some cases, this strategy is meant to reduce wage demands and to disguise existing low wages. But experience has shown that giving food allowances instead of meals may not be beneficial as many women tend to go without meals, preferring to save the money for their families. This selfless behaviour can result in women rapidly becoming anaemic and weakened at work.

Any food provided by the company should match the physical needs of the women. Carbohydrate rich foods such as rice, bread and potatoes will provide energy while vegetables and fruit will give the vitamins, iron and minerals needed for health and productivity. Women need iron rich sources of food such as chicken or goat livers, meat, fish and dark green leafy vegetables to prevent anaemia. A good diet is very important for pregnant women workers as the baby draws the nutrients from their system, particularly iron. Iron supplements are a vital part of antenatal care. Pregnant women workers should be encouraged to seek iron supplements from health centres and maternity clinics. Women doing hard repetitive work should be given high energy snacks such as dried fruit, nuts and biscuits or sandwiches.

Women on night shift should be given full meals which are nutritious but easy to digest such as vegetable soups, vegetable curries, rice or pasta.

The High Yielding Varieties (HYV) of rice that was the feature of the Green Revolution have subsequently been found to be deficient in micronutrients such as Vitamin A, iron and zinc (which is needed for healing). Yet many women exist on a bowl of rice, believing it to be enough. While this may have been true of the old rice

varieties particularly if they were hand pounded, in today's world, rice needs to be supplemented with vegetables, dried fish or soy products such as *tempe*.

Clean, cool water, tea and other drinks should always be available in the workplace and are as important as food.

With some reminding and steady agitation from women, things can change.

Chemicals

"I never know what they are called. It's just the blue powder or the yellow liquid that stinks. Its all the same to me. I just know sometimes I feel really weird!" —Fijian process line worker

Chemicals are so much a part of our lives that we forget some of them are very dangerous. Many of those found to be dangerous in the industrialised world are exported to developing countries where controls are more lax and where workers have less access to information about things that cause harm to health.

Thousands of new chemicals come to the market each year. Many of them are not adequately tested on animals as testing procedures take a long time. This should remind us that as women, we have to stay alert for any signs that the stuff we routinely work with does no harm to our bodies or to our future children.

Manufacturers and importers use a vast range of brand names to confuse us into believing the product we work with is safe. Paraquat (a very dangerous chemical used by farmers to kill weeds) is marketed, for instance, under a variety of names such as Chloroquat, Aloquat and others. This indicates the importance of making links with many workers in other countries to exchange information. But more about that later.

First, try a practical exercise to make you focus. List on your own or with friends all the chemicals you know that are used either in your own workplace or in the factories of your members.

Name of Substance	What it is Used For?	Do Women Have Direct Contact? How?	Any Known Harmful Effects?

Types of Chemicals

There are four major categories of chemicals that we need to be concerned about: metals, solvents, acids and alkalis (caustics).

Metals

It may surprise you to know that metals can also be classified as chemicals. While some metals like iron, zinc and magnesium are very important for human health, others, such as mercury, lead, chromium and cadmium, have no place or function in the human body and, in fact, can do serious harm.

Under normal conditions, metals are generally found in the form of solid lumps or dusts, the major exception being mercury which is a liquid. Metals are made into fine powders to be mixed with other agents such as paints or petrol or acids. In this form, they are more dangerous as they can more readily enter the body and the other substances with which they are mixed can provide additional danger.

Metals are eliminated from the body very slowly and can accumulate in areas such as the gums, brain, fatty tissues and kidneys. They are usually described as *systemic poisons* as their action is slow and results in widespread organ damage. *Localised toxins* or poisons have a more immediate effect on the body part where initial contact is made. For instance, while chromic acid has a direct corrosive effect on any skin it comes into contact with (localised toxicity), inhalation of the fumes will bring about chronic bronchitis, fever, headache or wheezing breath (systemic effect).

Larger particles of metal dust we breathe in are trapped by the throat mucous or hairs in the nose. Unfortunately, some fine dusts can escape these safety mechanisms and accumulate in the lungs. For instance, silica (which is a metal oxide) is frequently found in the lungs of miners and of women who make cigarettes by hand.

Some metals turn into airborne fumes when heated. Welding, braising and soldering, as required in the electronics industry, are the most common ways of converting metals to fumes. Car engines release lead fumes from tetraethyl lead. As a consequence of the toxicity of metal fumes, all welding operations should be kept separate from mainstream factory work, and welding and soldering areas should be well ventilated or located outside. Metal fumes are the most dangerous form as they are so fine that they can enter the lungs, be mixed in the blood and taken to other parts of the body. This type of metal fume poisoning is accompanied by fever, chill, coughing and pain in the chest.

Metals such as beryllium, arsenic and chromates can damage the skin if the worker is not well protected or if she does not wash up after each handling cycle.

Below is a list of a few of the most commonly used metals and their effects:

Lead. Used in paint, batteries, and soldering processes. We all have lead in our bodies from car exhausts and other industrial fallout but the dosage is small enough not to cause too much harm. The

exception is the air pollution found in large Asian cities where airborne lead is already at very dangerous levels. For instance, Bangkok, Beijing, Jakarta, Delhi and Bombay all have airborne lead levels from car exhausts that are dangerous to humans, particularly growing children and pregnant women. Fortunately, leaded petrol is being phased out but there are many already affected.

Lead is a significant reproductive hazard for men and women. It can cause high blood pressure, problems with digestion and nervous irritability. The first signs of lead poisoning are fatigue, irritability, headache, loss of appetite, muscle pains and indigestion.

Special chemicals in tablet form can help workers eliminate lead from their bodies. These are known as *chelating agents* and are also used to rid the body of mercury.

Mercury *(Sometimes known as quicksilver*). Fortunately, this is found less and less these days, except in factories which make medical or laboratory equipment (and in laboratories themselves), in factories making mirrors or in batteries. Mercury is also used to an alarming degree in small-scale gold mining operations in which many women are involved.

When heated, mercury rapidly converts to an airborne vapour which is easily inhaled. It has no smell or colour so it cannot be easily detected. The symptoms of mercury poisoning are very similar to those of lead poisoning. But mercury in the body often leads to fine tremors (for instance, shaky hands) and inability to sleep. High doses of mercury can lead to lung damage, kidney and brain damage as well as inflammation of the mouth and gums. In children, it can lead to severe mental retardation and physical disabilities. Pregnant women exposed to mercury risk having disturbed and disabled children, and thus, should be removed from such work areas.

Cadmium. This is commonly found in enterprises which do metal coatings and those which make or recycle batteries. It is also found in some solders in the electronics industry. Lung irritation from inhalation of the fumes is often delayed, and thus, a woman can receive a very serious dose before she realises it. The symptoms of cadmium poisoning are 'flu-like' fever, feeling of weakness and cough. Small doses over long periods can irreversibly damage kidneys and lungs.

Solvents

A solvent is a liquid which can be used to dissolve other materials. For instance, washing up liquids contain solvents which dissolve grease on your cooking utensils and plates.

There are two types of solvents:

- those that are mixed with water. These are known as *aqueous* solvents; and
- those that always contain carbon, known as *organic* solvents.

Acids, alkalis and detergents are examples of aqueous solvents. These will be discussed later under the heading Acids and Alkalis.

We should look at organic solvents now as they are more widely used in industries and are, on the whole, more volatile (easily changed into fumes or vapours).

Organic solvents are often used in industries to clean and dissolve other materials. We also use a lot of organic solvents at home—for instance, to thin or remove paint and as fuels (kerosene and lighter fluid). Solvents are also used in the laundry and dry cleaning industry where a lot of women work.

Because solvents are very volatile, they rapidly evaporate and mix with the air. The warmer it is, the faster they evaporate.

Try an experiment with nail polish remover. Pour the same amount into two saucers. Leave one in the room where you work and the other in a cooler place such as a refrigerator or under the stairs or in a dark cupboard. See which one empties faster.

Too much vapour in the air can damage women's health. The reactions to inhalation or skin absorption, which are the major entry routes to the body, range from mild irritation to serious disability or even death.

Again, pregnant women may be susceptible to solvent vapours because many of them can cross what is known as the placental barrier (the filtration system which screens the mother's blood before it enters the growing baby's blood supply) and interfere with the child's development.

Inhaled solvents are easily absorbed by the blood and move to other parts of the body. Many solvents affect the nervous system which is why signs like dizziness, drowsiness and irritability are frequently associated with high levels of solvent inhalation.

Solvents can also irritate the eyes, nose, throat and lungs of a worker. But each solvent has its own target site where it causes most damage to the body. (see Annex 6) Some target kidneys, others the liver or the blood, and some the digestive system. In addition, some solvents have been associated with cancer. (see Annex 2)

Many solvents have a strong smell enough to warn women of their presence but others (which may be very nasty) have only a slight odour. *A strong smell is not necessarily associated with high levels of danger.* For this reason, it is very important that workers be given full information about the substances they are handling at work.

Solvents and the Skin

Our skin is made up of many layers, all of which have a protective function. Small glands in the skin produce natural oils which lubricate the skin and make it smooth, supple and resistant to water. Because most solvents dissolve grease and oils, they also pose a major problem to the workers' skin. Many women who routinely use solvents end up with rough hands which split and become red and angry looking. This condition is known as *dermatitis*. In time, serious bacterial infections can set in which can be very difficult to treat. Other solvents like phenol can actually destroy the skin and the underlying tissues causing ulcerations and scarring. Others, like formaldehyde, create long term sensitivity which can flare up after any exposure, no matter how short.

Organic solvents can be further divided into those that contain chlorine and those that don't.

- The ones that include chlorine are known as *chlorinated*

solvents. As such they are easily identified as they contain the letters *chlor* somewhere in their name. For instance, methyl *chlor*ide or tri*chlor*ethylene. These chlorinated solvents can be quite dangerous when heated, and are known to damage the kidneys and the liver when inhaled or absorbed over long periods of time. Carbon tetrachloride, used in the dry cleaning industry, has been linked with cancer of the liver and so with tri*chlor*oethylene.

While chlorinated solvents are not on the whole flammable, solvents that are non-chlorinated such as turpentine and kerosene, are highly flammable. Care should be taken when using, mixing or storing these solvents. Sources of flame such as workers who are smoking should be kept away.

❖ Some of the widely used non-chlorinated solvents such as benzene, toluene and xylene can also cause liver and blood damage. Benzene, for instance, is known to cause leukaemia, a fatal blood cancer.

Handling of Solvents

Care should be taken to minimise skin contact with solvents.

❖ *Never wash your hands in solvents.* There are special soaps for industrial use that can be used to wash off heavy grease, oils and paints. Women should demand that these be made available in their wash rooms.

❖ Always use special gloves to handle solvents. *Cotton or leather gloves should never be worn* because they are not resistant to solvents. If the gloves become soaked with solvent, they will only make the situation worse. If suitable gloves are not available, use tongs, baskets or other mechanisms to reduce contact with solvents.

❖ Forced local ventilation should always be used to prevent the build up of fumes and therefore, prevent excessive inhalation of fumes. But in the case of some very toxic solvents, the use of cartridge respirators is encouraged (see illustration). The right type of respirator will filter out dangerous fumes through charcoal filters.

❖ *In areas of high exposure, cloth masks like what doctors wear are not enough and should not be accepted. Women should be aware that the filters in cartridge respirators need to be replaced every week or so. They need to independently learn how to take the respirator apart and replace the cartridges.*

❖ All solvent-using areas should be monitored to check contamination levels.

❖ Six monthly checks using badge style personal monitors available through 3M in most countries should follow any change in process or substance used.

❖ Any solvent spill should be cleaned up immediately before they vaporise and fill the room with potentially toxic fumes. Factories using toxic chemicals should have special substances on hand that can be used to quickly soak up

solvents and neutralise them (make them less harmful) before disposal. Throwing toxic chemicals into a river after cleanup just means that you are adding an environmental health problem to an occupational health problem. *You are merely shifting it, not fixing it.*

❖ Safety glasses or face shields will protect your eyes from nasty splashes. But just in case, make sure that management provides you with facilities to wash your eyes and body in case of spills. Special eye wash facilities should always be available in work areas where solvents are routinely used. They are inexpensive and specially designed to douse your eyes. Women have to be told to keep their eyes open during this process, no matter how hard this may be.

❖ *Workers who begin to feel strange and whom you suspect may be overcome by solvent fumes should be immediately taken outside for fresh air. If they appear to be in great distress, a doctor needs to be called.*

Acids and Alkalis

Acids. Acids can be found in our kitchen and in foods. Citric acid is what gives lemons and oranges their characteristic "bite," while vinegar contains acetic acid. These acids are relatively harmless though they may discolour your saucepans if left overnight. Alkalis, like caustic soda, are often used for cleaning blocked drains or very dirty ovens or stoves.

But industrial acids are much more powerful and concentrated, and are meant for stronger purposes such as cleaning, etching and neutralisation of waste. Acids are found in a wide variety of industries but more so in battery manufacture and recycling, and in the electronics industry.

The most common acids found in women's workplaces are sulphuric, hydrochloric, phosphoric and nitric acids. Hydrofluoric acid is found in the glass making industry and is very nasty, as it makes deep penetrating burns which can be very hard to treat.

Alkalis (Bases or Caustic). Alkalis are also corrosive and will attack the skin, eyes and respiratory tract causing bad burns and irritation. These are usually found in industries making soaps and detergents. They are called sodium hydroxide (also known as caustic soda), potassium hydroxide and ammonium hydroxide.

❖ Acids and bases can be found in the form of powders, liquids and vapours. The major entry routes to the body are through inhalation, the skin and the eyes. Again, eye wash stations and drench showers are vitally important in workplaces that use acids and alkalis.

❖ Some powdered acids and alkalis react with the moisture in the skin, nose, mouth, throat and lungs causing them to burn and irritate. At greatest risk are women's eyes as these chemicals can cause severe injuries and even blindness. Caustic soda, for instance, can quickly blind a worker if not washed out *instantly*.

- ❖ Inhaling large amounts of acid or alkali vapours can cause the lungs to fill with water, which, if left unchecked can lead to death. Long term, low grade exposure can result in bronchitis, or erosion of tooth enamel causing tooth decay, pain and eventual need for expensive dental treatment.

Handling Precautions (see also previous notes)

1. Always use a well-ventilated place to work with acids and alkalis.
2. Wear protective clothing (glasses, goggles, face shields, aprons and gloves). Clean up any spills immediately so they are not accidentally treated like water.
3. Storage of acids and alkalis should include clear warnings to workers that these chemicals are dangerous. Tops should be screwed on tightly, and containers should be stored on low shelves to reduce the risk of spillage into eyes when lifted. Acids and alkalis should never be stored together as they can react violently with each other and can cause explosion.
4. If any acid or alkali spills on workers, they should be ordered to wash off immediately under a drench shower. *They should not rub their eyes as this will make the burn worse.* You may have to talk with them gently if they panic.

How Can Chemicals Harm the Body?

Chemicals can cause:

- ❖ Burns to the skin and the eyes through their capacity to eat away the skin or through their ability to easily catch fire or explode.
- ❖ Choking and death when the gas from the chemical replaces air.
- ❖ Dermatitis because of their ability to remove the natural oils from the skin, leaving it dry and cracked.
- ❖ Cancer, because of their ability to alter cell structure.
- ❖ Various diseases such as kidney failure, through their ability to cause long-term damage to specific parts of the body.
- ❖ Damage to the nervous system, leaving women feeling dizzy, irritable, unable to sleep, feeling like they are going to fall over, etc.
- ❖ Reproductive loss including lack of menstruation, infertility, miscarriage and so on. A list of chemicals suspected of causing reproductive problems is found at the end of this book.
- ❖ Spasms of the respiratory system making it hard to breathe.

But it is important to remember that *not all chemicals are dangerous*, and some of those that are *can be handled safely with the right sorts of control.*

- ❖ Remember also that chemicals are only dangerous if they get inside the body in sufficient concentrations and over certain periods of time (Dose Response Relationship).

This is why information is so important.

How do Chemicals Enter the Body?

In the workplace, the major paths by which chemicals enter the body are by:

- ❖ Breathing in fumes or dusts;
- ❖ Absorbing chemicals through the skin;
- ❖ By taking them in through the mouth (This can happen if the workers do not have facilities to wash their hands prior to eating or smoking); and
- ❖ Sometimes chemicals can splash into the eyes, or enter through open wounds but these seldom happens.

Respiratory Tract

1. In the *respiratory tract*, chemicals can cause damage to the lung itself or be transported in the blood to other body systems.

Some gases cause irritation, the effects of which can be delayed. Other chemicals bond with the watery lining of the lungs to find their way deep into the smaller airways, where they cause long-term damage like emphysema or lung fibrosis (hardening of the lung). Others, like ammonia, cause a massive reaction in the upper reaches of the respiratory tract that they cause the workers to flee the scene.

Other gases, like carbon monoxide, bond with the part of the red blood cells that normally carry oxygen to the rest of the body. By doing this, they block the oxygen supply to the tissues. Breathing enough carbon monoxide from car fumes and cooking ovens (used to melt iron) can kill a person. Cyanide, which is used in plastic manufacture and metal plating, helps block another process which facilitates oxygen absorption, and can also kill a person.

Other chemicals are absorbed by the body and bind with fatty tissues where they accumulate or are released to cause tissue damage.

2. While some chemicals *enter the skin by passing through the layers of tissue beneath the skin, others enter through the minute hair follicles and through the entrance to tiny glands that keep the skin lubricated.*

Some chemicals, like caustic soda used in tanneries and soap making plants or acids, can burn the skin by causing localised or deep damage. Hydrofluoric acid, used in glass manufacturing and glass cleaning, can eat many layers of skin and enter the bone to cause very severe and painful damage.

3. Chemicals entering the body *through the mouth* are usually neutralised by the body's own chemistry, and if this does not happen immediately in the stomach, the chemicals are carried to the liver where they are broken down and disposed of (in faeces or urine). The major exceptions to this are the metals such as lead, mercury and cadmium, which accumulate in the body. Others, like organic solvents, actually attack the liver and can

cause extensive damage.

Safety and Health Measures

Dangerous chemicals in the workplace should be dealt with in the same way as other occupational hazards.

1. *A less dangerous substitute* should be found. For instance, using xylene instead of benzene.
2. *Workplace engineering controls* are needed to reduce the amount of chemicals available *in any form* (solid, gas or vapour) that can enter the body. Ventilation is of great importance here. It may be necessary to enclose and automate the process. For instance, dipping parts into corrosive cleaning baths using remote controlled wire baskets. As mentioned in the section on ventilation, lids should be used to control the escape of fumes.
3. *Personal protection.* Women should always wear *special clothing provided by management* to handle any chemical that may splash or run onto clothes and the body. Gloves, aprons, boots, face shields and respirators may need to be worn at times. All of these need to be matched with the types of chemicals as, for instance, some chemicals may dissolve ordinary rubber gloves or go straight through an ordinary respirator.

Now for another practical exercise. Here is a list of some of the commonly used excuses by workers and management to avoid taking action on occupational chemical safety. Think about each one and how you would respond.

- ❖ We've been using this stuff for years without problems! Why should we be worried?
- ❖ We provide the respirators but the women don't use them!
- ❖ Smoking (pregnancy/lack of motivation/laziness) is the real reason for workers' illness!
- ❖ You can't smell it, so it must be OK!
- ❖ If you never take any risk, there would be no progress (usually said by someone in an air-conditioned office)!
- ❖ Strict control of these things would be simply too expensive. We would have to close down!
- ❖ All the workers get regular medical checks. That should be enough.

Personal Protection and Hygiene at Work

The best alternative is to simply get rid of nasty chemicals and substances from the workplace. But in some cases, the materials are very specific to a particular process and cannot be substituted. It may be that the company, at a stage of its development, cannot afford to invest the large amount of money required to keep the factory safe for all. If this is the case, women need to request that they be given special protective clothing and equipment to ensure that workers are properly protected.

Women often do not like to wear protective equipment as they are hot, uncomfortable and ugly. In addition, a lot of them are made for larger Western faces or bodies so diminutive women from the South may find themselves lost inside! The respirator (face mask) is a good example. The nose piece is often made for large white honkers, and small Asian noses are not enough to hold them on! Grabbing at your mask all day is not the best way to get protection. If the mask doesn't fit completely, it is useless and should be discarded altogether!

To see if a mask is worth the effort, try this simple test. Put the mask on and then spray the front with hairspray or something that smells strongly like nail polish remover. If you can smell the chemical, then the mask is not worth the money paid for it and is unsafe.

If you think your health is at risk from the substances used in the workplace, you need to approach management with a list of demands. One of those should be that you and your friends at work be given the opportunity to be actively involved in choosing the type of protective clothing and equipment needed. With guidance from the Department of Labour or Health (Division of Occupational Health and Safety), management should select a range of equipment that is suitable for the job, and ask the supplier if you can try a few samples on the job. From the samples, the women themselves can choose which they feel most comfortable with.

But all women need to know *why* they have to wear this unsightly clothing. *If they don't understand why it is important or why they should have some say in what is bought, they will not comply—and who can blame them?*

Training and education are all important parts of the health and safety game. Women need to know how to properly wear the clothing, why it is important, in what parts of the enterprise they should wear it[5] and how to maintain it. Ear plugs, for instance, should be rinsed in warm soapy water each day and left to dry overnight. Respirator cartridges should be regularly replaced. Gloves with holes in them should be replaced immediately. Cracked or loose face shields or safety glasses should be replaced .

[5]All areas where protective clothing and equipment is required should be sign posted. Some enterprises go so far as to colour code all areas, so that in the event of an emergency, medical staff know immediately which area of the factory the patient comes from. For instance, areas using ammonia could wear blue or those working in the chlorine areas could wear green. In this way protective clothing and equipment could play very *positive* roles in emergency management.

A Small Test of Chemical Knowledge

1. Name at least three chemicals that you regularly use at work.
2. Which of these are toxic—that is, dangerous?
3. Are they always hazardous? Under what conditions are they dangerous?
4. If you cannot smell a chemical, there is not enough in the air to harm you. Is this statement:
   a. True
   b. False
   c. Sometimes true and sometimes false?
5. How can chemicals be swallowed if they are not intentionally eaten?
6. Why should solvents be treated with special caution?
7. What should you do if a chemical gets into your eyes?
8. Name parts of the body that are most vulnerable to acids and caustic substances.
9. Name two ways to avoid inhaling vapours from acid and caustic products.
10. Why should acid and caustic (alkaline) materials be stored separately?
11. How should acid and water be mixed?
    a. Should the water be added to the acid or
    b. the acid added to the water?
12. Can any metal be toxic (poisonous)?
13. Which are more dangerous, larger or smaller particles of metal?

(This test is adapted from a training booklet used by the American National Safety Council: 444 North Michigan Avenue, Chicago, Illinois 60611.)

Safe Use of Chemicals

Storage

All chemicals that easily burst into flame (flammable) should be stored in special containers *outside* the factory. All sheds or cupboards containing flammable or explosive chemicals should be marked with the proper international symbols. Notices that forbid smoking in the area should be posted. This should be strictly enforced, with instant dismissal for employees found smoking near inflammable or explosive chemicals (for instance petrol, thinners, kerosene).

Storage sheds containing large amounts of flammable chemicals should be surrounded by raised earth walls in case of spillage. The walls, known as *bunds*, act as a collecting dam to prevent the spilled chemicals from entering the workplace and to contain any fire that started after the spill.

Acids and alkalis (which feel slimy to touch like liquid soap) can react together to cause explosions and should *always* be stored separately. Even very small amounts of alkali chemicals coming in contact with an acid can cause explosion.

Handling

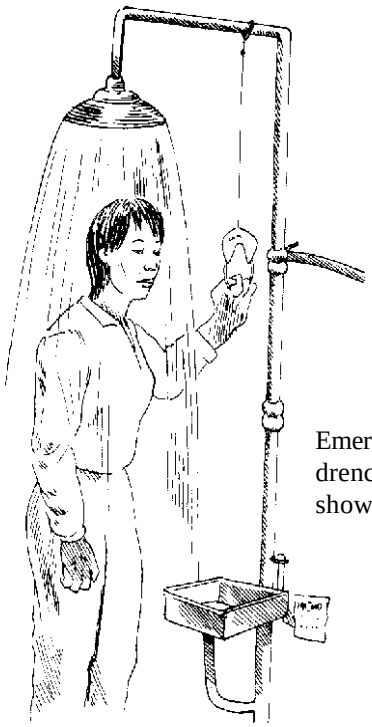
All chemicals are potentially hazardous in sufficient amounts over time. Some individuals are more susceptible to the effects of chemicals than others.

- ❖ A history of hepatitis can leave women vulnerable to solvents which affect the liver.
- ❖ Someone who is asthmatic may have her asthma attacks triggered by particular chemicals.
- ❖ A pregnant woman should be extra careful when handling

This is the next best thing to an emergency eye wash station. Note how she holds her eyes open.

Emergency eye and face bath station

Eye examinations are an important part of workplace medical examinations as they reveal small but possibly cumulative areas of damage



Emergency drench showers

chemicals because the rapidly growing baby inside her may be very susceptible to the substance being used.

❖ By using the right handling techniques and precautions, almost any chemical can be handled safely. Adequate and properly designed ventilation, enclosure of the area where poisonous chemicals are in use, use of protective clothing and equipment, and proper training in handling can significantly reduce the risk to women.


A device for handling heavy drums

❖ Mixing of chemicals should be done in a special area with metal or tiled benches for easy cleaning in case of spills.

When mixing water and acid, *the acid should always be added to water and not the other way around.* The sudden addition of water to acid may cause it to heat up quickly and erupt in the container.

Women mixing chemicals should be provided with safety glasses or a face shield, gloves and an apron. In some cases, breathing protection may be required.

❖ All areas where chemicals are mixed should be well-ventilated, with exhaust fans or open windows (louvered are best to control air flow so that splash-back does not occur).

❖ All areas in which workers handle acids, solvents or alkalis should be fitted with emergency eye baths and drench showers (see illustrations). If a woman spills acid, solvents or caustic materials on her body or clothes, she should enter the shower *immediately* fully clothed and stay there for at least 15 minutes. Similarly, if chemicals are splashed in the eyes, rapid assistance can save her sight. The eyes should be washed with clean water for at least 10 minutes. Special eye baths project water into the eyes at the right angle. Women may have to be encouraged to keep their eyes open as the normal response is to close them. Similarly, if they are frightened or embarrassed, they may not want to stay under the shower. Men should be kept out of the way to reduce embarrassment, and the woman should be told firmly and encouragingly to stay in the shower until the chemical is rinsed off. Factories that use toxic chemicals should provide coveralls or spare uniforms in case a woman has to wash herself and her clothes after a spill.

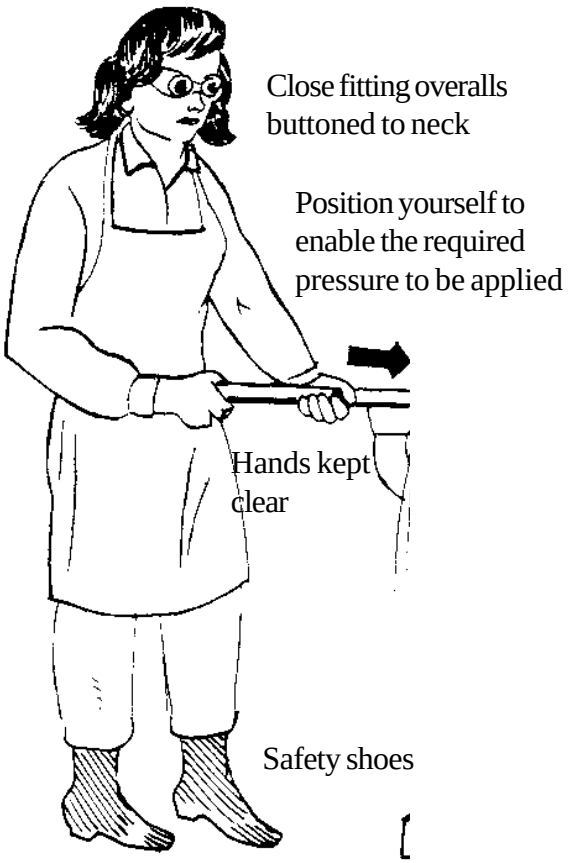
Hygiene and Personal Facilities

The International Labour Organisation (ILO), the labour wing of the United Nations, has a set of recommendations about the sorts of facilities that should be available to workers.

They recommend, for instance, that all workplaces provide women with enough toilets so women don't have to queue, washing facilities and lockers for the storage of personal items or clothes if the enterprise offers women uniforms and special clothing. Floors should be tiled or cemented for easy cleaning.

In addition, workplaces employing women should provide a rest area should a woman fall ill at work, a safe and quiet place to breastfeed her baby if the national laws allow (or encourage) women to do so, and a place to wash and store her things in case of menstruation. Facilities

Remember, safety is everyone's responsibility but you have to start with yourself



Avoid unsafe acts and conditions

Develop an Awareness for Safety

such as bins or incinerators for the disposal of used menstrual products should also be provided.

- Soap and towels should also be made available in places where chemicals, paints, dusts and other potential hazardous products are used and to discourage infection. In fact, soap should be supplied in all workplaces because research has shown that soap is necessary to clean hands of germs after using the toilet.
- *Washing in water* without *soap is* insufficient *to prevent diarrhoea caused by germs that come from human waste.*
- All workplaces should be fitted with water fountains offering clean, cool water freely available at any time of the day.
- Hard work in hot and dry workplaces can rapidly lead to *dehydration.* Women suffering dehydration will be dizzy and weak, and will pass only small amounts of highly concentrated urine, if any at all.
- Pregnant woman need to keep hydrated. In countries where diarrhoea is common it is even more important that women be able to freely drink to replace lost fluid.
- Clean eating areas, separate from the place of work and the risk of contamination, are also part of the normal provisions of most enterprises, as are kitchens which adhere to national standards of health and hygiene. If women are concerned about kitchen hygiene, they should invite the Department of Health inspectors to visit the factory and inspect the facilities. Rat and other forms of vermin control may need to be instituted. Stored food has to be refrigerated to prevent the growth of moulds and germs. Kitchen staff should observe rules of personal hygiene, and should wash their hands before handling food.
- Cleaners should be employed by the company to keep the toilets and washrooms clean at all times. Women workers should no longer do this in addition to their working duties.
- All uniforms or special clothing should be washed by company laundries at company expense to prevent women taking home contaminated clothing. Dirty clothing may present a hazard to other family members, especially children.

Strategies: Fix the Workplace, Not the Workers!

Now that you know a little about the threats to your health, what can you do? Go on strike? Yell at the managers? Sit back and accept that you feel helpless and overwhelmed? Or organise with your friends to take action?

So, you decide to take collective action. How do you best go about it?

Workers have been fighting the occupational health and safety battle for years, and some of their experiences may be of use to you. Some courses of action suggested here can be blended with your own tried and successful methods, or with those merely discounted as being useless at this stage.

The word "perhaps" or "try" is what this part of this book is about.

There are no "shoulds." Oh sorry, there are three.

- First, you *should always work collectively.*
  A woman acting on her own is vulnerable and may be sacrificed by being sacked or persecuted if she speaks out alone. Make sure any collective action involves collective responsibility so no one person can be singled out. Assign different parts of the task to different people so that you work as a team.
- Second, women workers *should always be clear about what their aims are.*
- Third, they *should also be clear about what equals success.*

Markers of success may be different from the objectives. It could be that the objective is to eliminate sexual harassment in the workplace. But the additional mark of success is that management institutes a reporting system with penalties for men who continue to show contempt for women's dignity and rights.

Similarly, you need to establish a fall-back position—that is, a "second best" option below which you will not negotiate. Again, using the sexual harassment example, your goal may be to eliminate sexual harassment in the workplace. The fall-back position may be to have the worst offender sacked or a reporting procedure put into place, with an agreement to investigate cases and protection for women who choose to give evidence.

Know Your Rights!

Their Workplaces, Their Machinery, Their Profits, Your Health and Their Responsibility!

The first thing to realise is that under international and most national labour laws, the management has direct responsibility for the welfare and health of its workers. This means that management is responsible for making the workplace as safe as possible, for training workers in the safe use of tools, machinery and the substances handled, for taking sufficient fire precautions and for providing safety equipment and clothing.

- Obtain a copy of the national safety and health laws and read them carefully. If you are confused and unclear about what they mean (legal language is always difficult to understand), seek help from a legal agency that deals with the poor or from a trade union. Be aware of your rights under the law and do not be tricked into believing that accidents and diseases happen because workers are lazy or stupid or for that matter, careless. Sit with your friends and read the law, and be sure that you all have the same understanding of what the law means.

  The law is often supported by regulations, codes of practice and local agreements that are negotiated with trade unions at each workplace, or for a particular industrial sector. It is important to know what they mean and how they also protect your

rights.

To do this, it may be useful to know what these things are:

❖ **Laws** are sweeping statements that define broad responsibilities and limits. They would say, for instance, that management is responsible for the health and welfare of workers, and would define what is meant by all the terms. They may recommend, for instance, that workplaces institute safety committees to take on some of the day-to-day monitoring. Laws define who is responsible for enforcement: centralised labour inspectorates or the worker participation model known as self-regulation. They describe the civil or common law responsibilities of companies. A breach of these responsibilities is an offence against the law. The law also defines punishments, such as fines or jail terms, for breaches of the law. If the situation is very bad in your factory, you may consider suing the company under these laws.

❖ **Regulations** define the social responsibilities, prescribe reporting procedures and the conduct and responsibilities of safety committees. Most importantly, they define the composition, responsibilities and safeguards for safety committees. Regulations define the Right to Know, which support the rights of women and male workers to be informed about the hazards they face at work.

❖ **Codes of practice** are technical documents which define exposure limits and methods of handling particular workplace hazards. For instance, there may be a Code of Practice for Chemical Safety which sets the limits for certain chemicals, details handling procedures and defines minimum standards for worker safety and health. An example is the correct storage and labelling of toxic chemicals, and the provision of information as defined in the Material Safety Data Sheets.

❖ **Collective labour agreements** are individual or sectoral agreements which define negotiation procedures and can be used to proscribe sexual harassment, grievance procedures and establish safeguards for pregnant workers, for instance. They can also be used to define needs for childcare or breastfeeding provisions. In countries where the occupational health and safety laws are weak, collective agreements can be used to supplement the laws. The agreements in this case would define the rights and responsibilities of workers to participate in and monitor

their own safety and health. This procedure along with a model agreement is set out below.

Identifying Hazards At Work: The Workplace Detective

Before you go to management with a list of demands, you may try to marshal some comprehensive and challenging data to prove your case. To do this is a little like being a workplace detective as we discussed above. You establish that there is a problem and set out to find the culprit by collecting evidence and clues. In this case, the culprit may be a chemical or an incompetent ventilation system but inevitably, management is responsible for the ultimate solution to the crime.

If you feel sure that the trade unions will support your cause, *always seek support from the trade unions for workplace action*. In some countries, women do not feel that trade unions represent their interests so they may be happier working on their own. However, trade unions have the legal status to support workers in the event that they are penalised by management or by the police. The male members of trade unions need to be made aware that women are radical, concerned and willing to take positive action. They also need to be able to let women plan the action and put it into operation without male intervention.

- The aim must be to establish your credibility and seriousness of intent to management. If you do it well you may succeed at the first attempt.
- Remember that the bosses tend to only think in money terms. You need to convince them that what you propose will either save them money or increase their profits. In general, arguments based on emotions, morals or ethics do not make any headway. It's almost as though managers lose their morals and ethics when they gain their promotion. The new "modern" industrial society, it seems, cares only for money and not for lives. But once that value system is appreciated, and economics and efficiency used as the focus for negotiation rather than outrage or appealing to fairness, then women have a greater chance of success. The sadness is that to succeed, women sometimes have to be as cynical as those who have control over their working lives.

Workplace action may seem difficult at first, particularly obtaining the types of systematic information. But with solidarity among the women, a sense of structure and a set of clear and agreed-upon objectives, it's not so difficult. Collection of systematic information means that you have a case to put to the Department of Labour or to the press for investigation, if management refuses your claims.

There are several tools that you can try:

1. Using maps of the workplace
2. Using checklists

3. Doing surveys of workers health
4. Investigating accidents
5. Staging campaigns

Making Maps of the Workplace

Maps are a good way of assisting women to focus on the issues at hand. Developing a picture of the workplace gives the issues a different scale and urgency, and makes sure that all women's voices and concerns are heard (as all sections of the workplace should appear on the map). Maps can also indicate the interconnectedness of workplace hazards. As an example, it may be that fumes being exhausted from one production process leak into another part of the enterprise because of faulty or broken ducting. Or, it may be that fork lift drivers take a short-cut through the production floor to get to the loading bay creating hazards for women on the production floor. Having a map which marks those hazards can stimulate creative discussion on redesign, repair or redirection of traffic to minimise danger.

- ❖ It may be possible to get a floor plan of the workplace from the management. If that is not possible, you can make one yourself. It doesn't matter if it is not a perfect drawing but it helps if the map is drawn to scale. Make several copies as you can record different things on each map.
- ❖ On one of the maps, mark all the exits, windows, fire extinguishers, machines and storage areas. Indicate all fire exits that are locked, extinguishers that are empty and windows that don't open. Add toilets, washrooms and light fittings.
- ❖ On another, mark things such as where chemicals are handled and where machines produce dust close to where women are working. On this map, note any points at which people have had accidents or where women have become ill. Indicate also where stuff is piled up in front of fire exits, where fork lifts carry goods to the store, where you think there is a risk of fire, etc.
- ❖ On the final map, put your collective ideas about how you think the situation could be corrected. For instance, you could suggest that work tables need to be moved to take them closer to natural light. It may be that ventilation systems should be added to remove dust or, as mentioned above, fork lifts should be re-routed so they don't pose a risk to women. You could indicate the position of machines which need maintenance to reduce noise, where storage racks need to be built to get things off the floor and away from fire exits, where benches need to be lowered or raised to reduce muscle strain injuries, where chairs need to be located to reduce strain on women's backs who normally have to stand for long periods, and so on.
- ❖ Using coloured pencils, mark areas of extreme heat or cold, or where hot machinery has burned women, or creates uncomfortable levels of heat. Note slippery floors or places where the floor is uneven, pitted or slippery, or places where women have fallen. Note any long trips that women have to take while they are carrying heavy loads. Get everyone to contribute ideas and experiences.

By working on an exercise like this, women can contribute information and ideas, and focus on both problems and solutions. It is always good to identify solutions along with the complaints so that management can focus on the positive side of what you are saying rather than just react to the negative. It also shows them that you are serious and have thought the issue through. It may also indicate that many of the solutions are not at all expensive but just a matter of changing locations, better maintenance, adding height to benches, or installing duckboards to raise women to the right height to meet the operational needs of the task, fixing the floor or improving supervision to ensure that waste does not accumulate.

Use of Checklists

In Chapter 2, the various hazards and things to look for in most of the industries where women work were listed. Put these points into checklists and perform a factory inspection before or after factory hours, or during lunch break.

- ❖ Some additional checklists are in Annex 4. This checklist covers ergonomics, chemical safety and other issues. Pick out subjects that are of relevance to your workplace. It may be wiser to ask several women to take responsibility for each subject, say, one for fire safety, another for lifting hazards, another for chemicals or machines.
- ❖ Make several copies of the results in case the originals "disappear" or are lost.

Surveys of Workers Health

Central to the role of a detective is to link existing evidence with the crime. In this case, the task is to gather information that links the conditions of work to actual illnesses and injury patterns. Doing this is also a good way of raising awareness and fostering solidarity amongst the women.

- ❖ It is important to make sure that both illnesses and conditions at work are *clearly* linked in some kind of cause and effect relationship. To do so, you must establish that the illnesses or accidents are related to the events or substances in the workplace. This linkage has to be defined by the dose response relationship, which means that you have to establish that the illness is related to the substance over time and through dosage.

As an example: Imagine you are working in a shoe factory and the management brings in a new solvent-based glue called *Glurp Glue*. After a few days, some women begin to complain that they feel dizzy and nauseous when they are at work. When thinking about this as a problem, you need to know if it is the glue that is causing the women to feel ill, or if it is a new infectious disease that they may have been acquired through unclean water supplies.

SURVEY

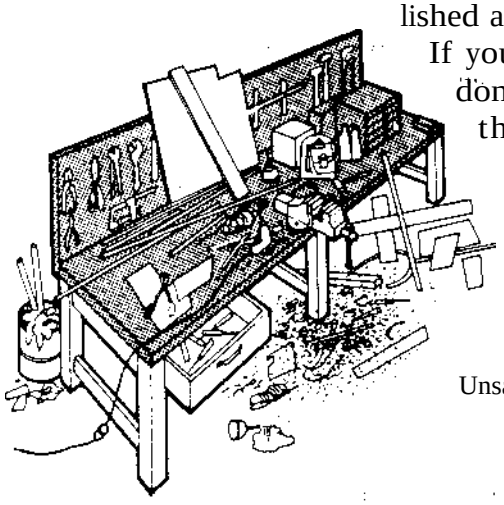
Doing a survey like this might be quite simple. First, you identify 10 women who are working with the new glue, and another 10 who are working somewhere else, maybe in the packing or storage areas.

You can simply ask questions like:

1. Age..... How long have you worked here?..... Are you currently pregnant? Yes/No
2. Do you suffer from any of the following:
   - a) headaches Yes/No
   - b) dizziness Yes/No
   - c) loss of appetite Yes/No
   - d) feeling sick Yes/No
3. How long have you been feeling like this?
   - a) since yesterday
   - b) since last week
   - c) since last month
   - d) since I started working here
   - e) for the past year
4. Do you use Glurp Glue? Yes/No
5. If you answered yes, how long have you been using Glurp Glue?
   - a) only this week
   - b) for the past two weeks
   - c) for the past month
   - d) since I started working here

Thank you for your time.

Can you see how the questions are linked and help exclude the possibility that the nausea is, for instance, due to pregnancy, which is one of the first things management might accuse women of. Can you also see how you manage to ask if the glue is linked with the illness without actually asking "Do you think the glue is making you sick?," which is a leading question, and may create the link in women's minds even if there is no link in actuality. By asking questions about the duration of illness and duration of Glurp Glue use, you have established a temporal (time associated) link. If you find that the 10 women who don't use Glurp Glue do not have these symptoms, your case is



Unsafe Conditions of Work

solid. You can then request that a new and safer substitute be found.

If the 10 women *who do not use* the glue are also feeling ill, then the problem is bigger and may be due to leakage of Glurp Glue fumes to their work area, or may be due to airborne dust or vapours from another source. It may be that the water supply is contaminated or the illness may be due to something else entirely. If the plant is air conditioned, it may be that the filters in the water cooling towers need cleaning, and that the air is laden with bacteria that make people feel like they have flu. You may need to develop a new survey to exclude these other possibilities. You have to use the skills of a detective to find and balance the clues, and then find the culprit.

If possible, obtain the official sickness records from the company polyclinic or personnel department, and ask the women workers themselves to suggest reasons for illnesses and accidents in particular departments. They may have many clear ideas about why things continue to happen in dispatch, for instance. Maybe someone spilled a solvent there a few weeks ago, and it was never cleaned up.

Investigate Accidents

In industrialised countries, it is usual to investigate accidents which are serious enough to result in death or workers having to take time off work to recover. The investigation team is usually composed of workers, management and representatives of the Department of Labour. The investigation of accidents also establishes fault, and is used by the insurance company to assess the amounts to be paid out to injured workers and future premiums to be paid by the company.

An accident (sometimes what happened can be called an incident even if no one was actually injured, but damage to property or possible damage to employees in the future is likely to occur) is defined as "an unforeseen event or one without an apparent cause, anything that occurs unintentionally or by chance." However, an incident can also be defined as a loss event in which both machinery, materials, reputations and health is lost. Each of these, despite definitions, are entirely preventable and chance plays little part in the process.

For a variety of reasons in the Majority World, the investigation of accidents is not as common, and accidents, unless they hit the news headlines, usually pass without notice. This is unfortunate as accidents provide us with valuable information about failing systems. What we learn from investigating one accident can be used to prevent others. In addition, lost time and materials represent a significant profit loss for the employer. Experts have estimated that the *indirect costs of an accident are four times that of the direct cost* brought about by the time lost from work by the injured employee(s).

Let us hope that you and your friends at work do not fall victims to accidents. But if one happens, it is strongly suggested that you try some of the techniques of investigation listed below so as to prevent it from happening again. The information gained from investigating accidents also indicates to management that they are failing in their responsibilities of protecting workers' safety and health.

Example of the Medical Examination Form to be Completed by a Doctor After Examining Someone Suffering an Occupational Accident

Name of Injured Person: Age: Sex:
Address:
Name and Address of Employer:
Date of Accident: Time of Day:
When did disability begin: (from that day of the accident or later?)
State, in patient's own words, what happened:

Give accurate description of nature and extent of injury and state your examination findings:

Will the injury result in a permanent disability? If so, what?
Will the accident result in facial or other disfigurement?
Will the accident result in mental impairment?
Is the accident the only cause of the patient's disability or condition? If not, state other possible contributing conditions:

Is the patient suffering from any disease of the: heart, lungs, liver, brain, kidneys, blood system, or any other disability not related to the accident? Give particulars:

Has the patient any impairment to physical or mental function that was due to a previous accident or disease? Give particulars:

Has normal recovery been delayed for any reason? Give reasons:

Date of your first treatment: Describe treatment given:

Were X-rays taken? By whom? Who requested?
X-ray Findings and Diagnosis:
Has the patient been treated by anyone else? Who:
Was first aid given at the work site? By Whom?
Was first aid appropriate to the condition?

Was patient hospitalised? Date of Admission: Date of Discharge:
Is further treatment needed? For how long?
What type of treatment is required?
Patient was able (will be able to) resume *normal* work on:
Patient was able (will be able to) resume *light* work on:
In your opinion, should the patient be eligible for workers compensation?

If death ensued, give date and reasons:

Do you recommend vocational rehabilitation will be: (a) necessary (b) possible (c) unlikely

Remarks about rehabilitation

Final diagnosis and recommendations about prevention of further similar occurrences:

Physician's Name and Qualifications:
Contact Phone Numbers: Patient's Signature:

Your investigation should include giving attention to:

- ❖ the people
- ❖ the equipment
- ❖ the process
- ❖ the knowledge

If you or your friends have a camera, taking photos of the accident site and outcomes may help others recall the situation when you discuss it later.

Most accidents are caused by one or a combination of the following:

1. Machine failure
2. Operator fatigue
3. Poor training
4. Poor lighting
5. Fast work pace
6. Poor maintenance
7. Unsafe machinery or systems of work
8. Poor match of worker and job (too short to reach the required height, too weak to pull the lever on the machine, lever too tight and too short so there is not enough leverage)
9. Bad housekeeping (slippery floors, power cables everywhere, poor insulation on cables, too much mess around, no warnings from fork lifts, etc.)
10. Inadequate ventilation
11. Inadequate warnings so workers do not know the degree of hazard presented by a certain chemical/situation/process
12. Operator being distracted
13. Poorly-guarded machinery or processes
14. Stress and work pressure
15. Failure of protective clothing or equipment, including poorly designed clothing which obstructs view or needs continual adjustment
16. Poor supervision
17. Inadequate storage of goods, stacks are too high, too unstable, etc.
18. Poorly-designed machinery with stop controls out of reach
19. Inadequate tools (poorly designed, poorly maintained, poorly stored)
20. Pre-existing illness or weakness (such as anaemia which results in fatigue)

The Investigation Process

1. Interview all witnesses and if possible the victim(s). Ask them what they saw, what they heard and what they thought happened. Take that information and see if it fits into one or more of the categories in the box.
2. Ask them about the workers' state of mind before the accident: were they happy, sad, angry, contented, agitated, confused? What was her relationship with the supervisor? Was the worker clear

about the task? Did she feel pushed or rushed?

3. Had the worker said anything to them about the machine she was working on, the pace of work, the fact that she felt unsure of what to do, the poor maintenance?

4. Sit at the workplace yourself and see what it feels like. Can you see clearly? Are there shadows over the work? Are there any distracting noise or object?

5. Ask the victim(s) and other workers if they had sufficient training to do the job safely. Were they told about safe procedures? Did the machine have guards to prevent hands, fingers, or toes from entering it?

6. How many hours had the victim(s) worked without a break? Were they wearing protective clothing? Was it suitable? Did it fit well? Was it well-maintained?

7. Was there enough space to avoid the accident or is the workplace so crowded that it was impossible to take evasive action?

8. Had she been bothered by sexual harassment from the men in the workplace?

9. Comment on some of the factors in the box above and how they might have influenced this particular incident.

10. Ask the victim(s) and the others how they think the accident could have been avoided.

11. Lastly, make some calculations about how much the company lost because of this accident. For instance, three days of lost production due to workers' absence, loss of materials, other workers not able to work due to shock, machinery out of action, cost of health care for the victim(s), fines for breaches of the law, increased insurance premiums, etc. Management is usually more vulnerable to arguments which prove to them that to continue with "business as usual" without any change to work place design or methods will directly cost them money. Even if they find and train a new worker, they still lose that worker's productivity while he or she is learning the task. It makes more managerial sense, and is cheaper, and more efficient, to value

and take care of existing women workers. That is the message you need to convey.

The results of your investigations should be given both to management and the Department of Labour, and should be signed by all the workers involved to prevent any one person being singled out for retribution.

Staging Campaigns

It may be that women are very concerned about one particular facet of workplace safety such as hearing loss, sexual harassment, stress or the problem of dusts. It may be that women want the owners to get rid of a particular machine that has injured many workers. If management does not support your attempts to improve things, you may have to take matters into your own hands. Make a list of topics that you as a group are concerned about. Choose one of particular concern to the majority of women. Brainstorm about the ways in which you can make your voices heard and about the information you need to initiate a campaign on. Establish clear goals for your campaign. It may be to educate the others, to raise public sympathy or awareness of the situation, to encourage consumer boycott of the products, or simply to show management that the women are serious about the need for workplace reform.

Things you can perhaps do to promote safety in the workplace:

- ❖ Ask women to design and draw posters about the chosen issue. The posters can be hung in the workplace.
- ❖ Go to the media to make an announcement that as women you are concerned about the chosen issue, and why.
- ❖ Put placards outside the factory which announce that this workplace has problems with the issue you are concerned about. Placards that say "The bosses are deaf to the workers' demands for hearing protection," or "We are having a dust up (slang for fight) about dust." Give some humour to the campaign so it may attract attention.
- ❖ Stage workers' theatre after working hours, during lunch hours or on weekends, and invite the media.
- ❖ Involve the local trade unions or other women from the surrounding factories if they share the same concern in a "workplace health fair" or other public event.
- ❖ Erect "memorial plaques" made of cardboard in the workplace, each representing an accident or incident involving workers' health.
- ❖ Organise a local or provincial "Workers Health Action Day" and celebrate it with songs, exhibitions, plays and other events. This can be coupled with appeals for law reform in countries where the laws are still archaic and preclude worker participation.

By taking responsibility for worker education and raising the level of awareness among workers, management may agree to take action if only because they are ashamed. Even if the managers refuse to act, you have gained from the experience and the solidarity. You have ac-

quired new knowledge and insights that will be useful for future activities, and, hopefully, you all have had some fun!

Occupational Health and Safety Agreements

In countries where labour laws are not strong, or the law does not allow for workers' involvement in occupational health, women, in liaison with trade unions, may consider the development of a system of *occupational health and safety agreements* with individual enterprises, or more effectively, across industrial sectors.

Words Of Caution

The development and adoption of health and safety agreements involve a lot of organisational skills and are not to be recommended as the first action, or the goal of a largely unorganised group without the legal support of a trade union.

Occupational health and safety agreements are not a substitute for law reform or for the introduction of laws that encourage workers' participation in workplace health and safety monitoring. They are, in fact, an intermediate stage which can adequately demonstrate to both industry and governments that women can be effective technical managers of complex workplace hazards if given the information and the freedom to act.

Central to the success of health and safety agreements is recognition by management and workers of the right of one worker to speak on behalf of the others with regard to occupational health and safety. This health and safety representative, thereafter, becomes the workers' advocate and has the right to be involved in all workplace negotiations without being penalised for her actions.

This is a pretty tall order in some countries where women are expected to be compliant and obedient to men in general, and management, in particular. It is also a tall order in authoritarian countries which routinely deny people freedom and democracy, and where labour activism is seen as a threat to the ruling power.

So, what is proposed below is an advanced step to take, requiring a lot of collaboration, strategy and careful negotiations. As such, it is a strategy that must be very carefully thought out before any overtures can be made to the company or industry.

Finally, and most importantly, the workers' safety representative needs to have access to good technical information to support negotiations and plans which are put to management. If this type of information is not readily available in your country, it may be difficult for the representative to feel competent to act on your behalf.

Safety Agreements and Safety Committees

Many companies will complain that safety agreements are not necessary as the workplace already has a safety committee, as stipulated in some Safety Acts.

Most safety committees are dominated by management representatives or are composed of men, having little or no women's repre-

Model Health and Safety Agreement Between "Company X " and "the unions"

1. Introduction

A. Management, employees and their unions recognise the importance of developing and maintaining healthy and safe working conditions in all company workplaces, and the importance of keeping the health and safety standards in these workplaces under constant review. This goal can best be achieved through joint involvement of management, employees and their unions at all levels.

B. The purpose of this agreement is to set out the responsibilities of all parties and to establish a structural framework in all workplaces and company levels within which all parties may be involved in protecting workers' health and safety.

C. The company's management will strive to improve the standards of health and safety in all workplaces and will regard existing standards, regulations and codes of conduct, such as those produced by Standards Association, Department of Labour, Department of Health, etc. as the minimum acceptable levels. These standards will be incorporated within the company's formal written instructions on health and safety.

D. The joint involvement of management, employees and unions in health and safety matters will be achieved through the following agreed responsibilities and structural arrangements.

2. Agreed Responsibilities

A. Management

(1) Management of the company recognises that it has a legal responsibility to provide a healthy and safe place of work and that this responsibility is not diminished in any way by this agreement. The involvement of workers in jointly determining with management the standards and criteria that define a healthy and safe place of work does not make these workers legally liable for any incident or other adverse outcomes that may occur.

(2) The company will, in consultation with workers and their union representatives, formulate a written comprehensive health and safety policy which, amongst other things, will:

(a) state the health and safety responsibilities of all levels of management;

(b) detail the levels of management responsible for implementing the decisions of the health and safety committee; and

(c) ensure that finance is available to implement this agreement.

B. Employees

All employees will follow agreed upon safe working practices, instructions and rules covering, for example, wilful misuse or reckless interference with equipment with the intent of avoiding risk or injury to themselves or others.

3. Structural arrangements

A. Health and Safety Representatives

Unions party to this agreement will appoint an agreed number of workers as health and safety representatives who will be recognised as such by the company. These health and safety representatives will represent workers on joint management/union committees established through this agreement. They will be accountable to the workers they represent through the established shop-floor and official trade union communication channels.

(i) Areas of coverage for each health and safety representative are listed in a schedule attached to this agreement.

(ii) The senior management representative of each agreed workplace will be notified in writing of the names of the health and safety representatives elected and the group or groups of workers they represent.

(iii) Health and safety representatives will be appointed for a period of two years, subject to union rules, and be eligible for re-appointment. Continuity of experience is important. Where a health and safety representative is absent, a proxy will be appointed.

(iv) Health and safety representatives will have the functions and powers needed to

play a constructive and responsible role. These will include the following rights:

(a) to inspect all or part of their designated workplace at any time;

(b) to investigate potential hazards and dangerous occurrences at their designated workplace and to examine the causes of these hazards, dangerous occurrences and any incident that may occur;

(c) to have access to all health and safety information concerning products, materials and processes used in their establishment;

(d) to be informed of any incident or injury occurring in their designated workplace and, if work has ceased, to carry out an inspection of the site of an accident before work resumes (if practicable);

(e) to be given copies of any report (excluding medical-in-confidence information) prepared by management or consultants arising from any injury, disease or accident occurring in their designated workplace and to be present at any discussion between management and any worker concerning an accident, injury or disease;

(f) to have access to all reasonable facilities needed to perform their functions;

(g) to be given time off with pay on an agreed basis to perform their functions;

(h) to call in union consultants of their choice after prior notification;

(i) to be given time off with pay to attend health and safety training courses offered by trade unions, ILO, government or other safety organisations;

(j) to form a workers' committee autonomous from management, ensuring that such committee does not replace any existing union committee, including those established at the shopfloor; and

(k) to be consulted by management prior to any changes to their designated workplace which may have implications on the health and safety of the employees they represent.

(v) Health and safety representatives will notify the senior management representatives at their workplace of the findings of their inspections and investigations and will make any suggestions for improvements in working conditions in writing. All such written suggestions will be responded to by management.

(vi) Where a health and safety representative considers that there exists an immediate threat to the health and safety of the workers he or she represents, the representative may then instruct workers to cease work pending a full investigation by management and worker representatives. Prior consultation should occur wherever practicable. No wages will be lost during the course of such investigations. Employees will be re-deployed where feasible but not stood down (dismissed).

(vii) No action taken by a health and safety representative under this agreement shall be construed as imposing any duty other than the ordinary duties of an employee.

(viii) No action taken by a health and safety representative in accordance with this agreement will be used for the purpose of dismissal or other disciplinary action by management.

B. Plant-Level Health and Safety Committees

(i) In each plant or establishment, health and safety matters will be dealt with through a joint management-union health and safety committee.

(ii) These committees will have as their terms of reference the consideration of any matter relevant to workers' health and safety raised by management or health and safety representatives.

(iii) There will be management representatives and an equal number of union representatives on the committee and it will be chaired by a member of the committee. The size of the committee should be kept as small as practicable.

(iv) Management representatives will include the plant managing director, the director of production and the director of personnel (human resource development) or industrial relations.

(v) Union representatives should come from among local health and safety representatives, although corporate officials and union (national trade union body) branch officials may attend as observers, with prior notification.

(vi) Occupational health staff should be non-voting consultants to the committee and should attend meetings in that capacity.

(vii) Committee members will be appointed for a period of two years and will be eligible for re-appointment. Elections should be staggered to ensure continuity.

(viii) The committees may call experts or consultants as the need arises.

(ix) The committees will regularly consider:

(a) written reports on accidents and injuries, together with recommendations as to how such accidents and injuries can be avoided in the future;

(b) results of all environmental and personal monitoring carried out at the workplace; the causes for any unusually high concentrations of any toxic material will be investigated and recommendations for their elimination considered; and

(c) results of all medical monitoring (in aggregate) together with recommendations.

(x) No new chemicals or physical agents, or new installations or processes which may be harmful to health shall be introduced into the establishment until all available data concerning their likely health effects have been evaluated and their use endorsed by the committee. In the case of chemicals, full available data on chemical identity and toxicity will be supplied.

(xi) The committees shall develop joint policies on a whole range of preventive measures such as the safe handling of toxic materials, environmental and personal monitoring, medical monitoring and other matters.

(xii) The committees shall consider and settle health and safety matters referred to them which have been the subject of dispute and not resolved at local workplace level. The committees shall also have access to reports and information on matters resolved at the local workplace level.

(xiii) The committees shall meet regularly with a minimum of at least six times a year. Emergency meetings can be called by a procedure to be agreed upon. If there is a failure to agree on any item brought before the committee, this matter will be referred to a higher company committee as discussed below, or to a mutually acceptable consultant. Committees will operate on the basis of solving problems as close to the workplace as possible and arrive at decisions and recommendations by consensus. Decisions of committees will be posted for all employees to see.

(xiv) The committees will determine the adequacy of health and safety training programs within the establishment.

C. Company Health and Safety Policy Committee

(i) For the company as a whole, management will consult regularly with workers and their unions through a corporate level, the health and safety policy committee (HSPC).

(ii) This HSPC will have as terms of reference any matter raised by management or union representatives concerning the health and safety of workers in the company.

(iii) The committee will have an equal number of management and union representatives and will be chaired by a member of the committee.

In general, management representatives in the committee should include, for example, the general manager, industrial relations manager, operations manager and technical manager as well as other appropriate management representatives.

In general, management representatives should occupy senior corporate positions. Union representatives should come from union officials and from workplace health and safety representatives, although peak council-officials[6] may attend as required.

(iv) Two members of occupational health and safety staff should be non-voting consultants to the committee and should attend meetings in that capacity.

(v) Union representatives on the committee will be appointed for a period of two years *and* will be eligible for re-appointment. Appointments will be staggered to ensure continuity.

(vi) The committee will meet at least once every three months but more frequently as

circumstances dictate from time to time.

(vii) The committee will keep under review arrangements for the identification of potential safety and health hazards, the prompt investigation of accidents, the determination of causes and contributory factors and the implementation of corrective action.

(viii) The committee will regularly review reports (excluding medical-in-confidence information) on:

(a) accidents, injuries and diseases, or surveys together with recommendations as to how such occurrences can be avoided in the future;

(b) summaries of environmental monitoring carried out at company establishments;

(c) summaries of medical monitoring (in aggregate) together with recommendations; and

(d) minutes of plant-level health and safety committee meetings.

(ix) The committee will consider and settle health and safety matters referred to it which have been the subject of dispute and not resolved at establishment level. The committees will also have access to reports and information on matters resolved at the local level.

(x) The committee will develop joint policies on matters affecting more than one plant on a whole range of preventive measures such as the safe handling of toxic materials, environmental and personal monitoring, medical monitoring and other matters.

(xi) The committee will develop the policy for induction courses for new employees on health and safety matters.

(xii) Minutes of committee meetings will be posted for all workers to see. They will also be forwarded to unions party to this agreement.

4. Agreed Principles for Control of Working Environment

A. The company will compile and keep an up-to-date list of all toxic materials used by its workforce. This list will be available for regular review by the policy committee and each health and safety representative will have access to a copy of the complete list. No new chemicals or physical agents or new installations or processes that may be harmful to health shall be introduced until all available data concerning their likely health effects have been evaluated and their use endorsed by the policy committee. In the case of chemicals, full data on chemical identity and toxicity will be supplied.

B. All new equipment purchased by the company should comply as a minimum with standards (developed by the company, industry, or by such bodies as the Standards association) designed to minimise potential adverse health and safety effects.

C. Regular environmental and personal monitoring will be conducted where agreed. The monitoring methods used and the measures for controlling the use of harmful chemical and physical agents will be those approved by relevant recognised authorities.

D. A program of medical monitoring where agreed will be kept under review by the policy committee. Records will be held by the medical officer and will not be divulged to management, unions or other employee representatives without the individual's explicit consent. An individual will have access to his or her own medical record if so desired, but only in the presence of the medical officer and union delegate. Trends revealed by the medical monitoring will be reported by the medical officer at the joint union/management policy committee with appropriate recommendations.

5. Conclusion

A. This agreement will take effect from the date of signing, and company health and safety committees will be installed within three months after this date.

B. In establishments where health and safety agreements or participative arrangements are in place at the signing of this agreement, these will be reviewed to ensure that they are not inconsistent with the principles and standards set out herein.

C. Management and unions at each plant will negotiate and jointly sign a local accord giving effect to the principles set out in this agreement and specifying local arrangements relating to committees, health and safety representative and other relevant arrangements.

[6]Peak Councils refer to provincial or national bodies. In the Australian context that would be the Trades and Labour Council (provincial or state body) and the Australian Council of Trade Unions (national). Similar structures may exist for employer groups.

Signed on behalf of

The Company:
Date:
The Unions:
Date:

Source: Adapted from Mathews J. Health and Safety at Work: Australian Trade Union Safety Representatives Handbook. Australia: Pluto Press 1992.

sentation. Safety committees do not, as a rule, have any right to override management. Nor do they have elected representatives who have clearly defined rights to act on behalf of workers. *The crux of the safety agreement is the establishment of this elected post.*

The basis for the agreement is that it sets out clearly the respective rights and responsibilities of both workers and management, defines the point at which the government is to be involved, and is a protective umbrella under which the workers' elected representative can function to advocate the concerns of workers of both genders.

The ideas posed in the agreements are based on the International Labour Organisation's (ILO) Convention 155, which promotes workers involvement in workplace health and safety—under a model known as Self Regulation. The ILO Recommendation 64, which supports the International Labour Convention 155, was issued in 1981—a long time ago, in terms of recent labour history. Yet this Convention has been signed by so few countries in the Majority World as capitalists appear to be afraid that to initiate health and safety programs would eat their profits too far. This is despite evidence that shows that industries that have highest morale, productivity and standards of productivity are those which care most for workers' health. Not to operate a safe factory directly costs owners large amounts of money in lost production and materials, and poor productivity. *Not surprisingly, workers do not care for work places that do not care for them.*

Collective labour agreements provide management a framework in which they can feel safe from wildcat industrial action, and from which they can negotiate productivity gains in return for improved health and safety.

Structure of Agreements: A Real Example

In the box you will find an example of an occupational health and safety agreement that was formulated by Australian trade unions in the 1980s, before law reform made way for worker participation and self regulation. It provides a useful guide to how agreement should be structured and worded, and to make sure workers have the powers and protection needed to conduct their health and safety activities responsibly.

Your agreement may not be as comprehensive and as long as this example. You may want to make it simpler or less threatening if you feel that will give you greater margin for success. However, *it is better to negotiate up than down.* Once agreed and signed, employers may be reluctant to agree to further changes, improvements or additions to the agreement. So, be sure that what you all agreed in the signed proposal are the *minimum requirements.*

Workers should pay particular attention to the rights and powers of the safety representatives and the committee as this is pivotal to the expression of workers' viewpoints and the role of this person has to be suitably protected. He or she may be the bearer of bad tidings to the management. Throughout history, bearers of bad news have been killed by the recipients. So, make sure they are well-covered by protective clauses!

Committees play an active role in reviewing new legislations, regu-

lations and codes of practice, and developing courses of action that will ensure real changes at shopfloor level. The committee is also a forum for workers to air complaints and problems, and where the effects of committee action in dealing with workplace health and safety can be reviewed.

However, the safety representative need not consult the committee on every problem but should be free to negotiate with first line supervisors and management directly. The outcomes of those meetings should be relayed to the committee for review and comment.

Committee representation should comprise all the elected workers' safety representatives, with one being delegated with the role of convenor for an agreed period.

Management representatives should be of sufficient status who can take financial responsibility for agreeing to a course of action, and not merely acting as a messenger to senior management.

The committee should see its role as a problem solver and manager of the process of health and safety. It should have the power to appoint consultants on such difficult issues as noise control or control of chemical hazards, or ask the inspectors from the Department of Labour for assistance (if they are thought of as being impartial).

The committee should be seen as collaborating with the Department of Labour to uphold the law. Its role is *not* to reinterpret the law for extended battles about other issues, such as wages or leave benefits.

It can, however, deal with issues of relevance to occupational health, such as workers' compensation difficulties or the provision of adequate medical or first aid attention at work.

Facilities For Workers' Representatives

Management needs to accept that to maintain health and safety, and to be a responsible representative, the woman delegate may need to take time off work during the day to discuss issues with the workers, to carry out investigations, and to read and absorb reports. She should not be financially penalised for these activities. Her loss of productivity needs to be traded off against productivity gains from improved performance and reduced losses.

If possible, she should be given a cupboard or cabinet to store papers and records, and should have access to sickness records, and results of management and Department of Labour's inspection reports.

Representatives should be given time off work with full pay to attend training courses that may be provided by the trade union or national office of the International Labour Office, or Department of Labour.

Rather than wait for this training to be offered, representatives should actively approach the Department or trade union and request that this be given. In many nations of the Majority World, this training can be organised by the ILO in collaboration with national or international trade unions.

Representatives should be given the right to accompany the labour inspectors on work site rounds and to talk with them confidentially as well as in public.

Technical Information and How to Get It

As this book has repeatedly pointed out, the door to the world of occupational health can be opened with the key named information. With advances in international communication technology, workers of the world are increasingly able to gain access to technical information which can preserve their health and well-being. But the hardware which is required is still quite expensive for small independent groups of women.

Purchase cost of computers and CD-ROM (readers which allow you to read information of a disc that looks like and, in fact is, a compact disk) systems is not the only cost. Added to this are the costs of phone bills, subscription to Internet systems and access to information updates on CD-ROMS. Internationally-based trade unions or partner unions in the industrialised world may be pleased to assist in setting up and running an information system. An exchange of information and mutual assistance in campaigning on issues (particularly those related to globalisation) would be for everyone's benefit, and reduce any uncomfortable feelings of obligation or dependency.

Trade unions provide some information. In Australia, various workers' health centres affiliated with trade unions provide monthly or yearly newsletters to members. The Swedish and Finnish governments provide free newsletters to people who request them. *It is literally a matter of one type of information leading to another*. It may be that your local trade unions or branches of labour organisations know of others. We need to use them all to gather knowledge to build our strength.

It may be that you need to make contact with a regional trade union body who can make technical information available or use technical assistance money from one of the multilateral trade union agencies, such as the International Confederation of Free Trade Unions (ICFTU), to purchase a computer system and CD-ROM reader to be able to gain access to data bases. An increasing amount of this data is also available on the Internet and World Wide Web.

Conclusion

All too hard you might think. But as the Chinese said, a journey of a thousand miles starts with one small step. Choose your step carefully and gain confidence.

Women are capable of anything. It's all up to us. In our own small way, we can lead a workplace revolution. Act together in good faith—and good luck!