

ANNEX 1

MATERIAL SAFETY DATA SHEETS - AN EXPLANATION

The energy and life force of this book comes from the belief that information gives power, and that one of the ways in which we can reduce inequities between workers and capital is to provide information about labour issues.

Of the methods used to communicate work hazards to employees, Material Safety Data Sheets (MSDS) have proved to be one of the most successful and comprehensive. However, just knowing they are important is no substitute for knowing a little more about them.

This annex defines MSDS and gives you a few practical examples.

Definition

MSDS is a structured, technical document that provides information about a specific substance including its chemical structure, safe handling procedures, storage, and disposal.

The level of language in an MSDS is meant to bridge the gap between specialist technical sources such as toxicological texts and the immediate needs of the workplace.

Purpose

Importers or producers have a regulatory obligation to produce specific information about individual substances. The information is to prevent both environmental and occupational mishaps.

Western nations, such as Australia, demand that MSDS be updated every five years to ensure that the information presented in them reflect the latest research results.

In the West, MSDS have to be made accessible to all concerned. They should be obtainable on request by workers' representatives, prospective buyers of the product, medical practitioners who are treating a worker or emergency service personnels such as fire fighters.

They are to be kept by the store person or whoever is responsible for the ordering and storage of hazardous substances.

Structure of the MSDS

All ingredients of a substance including any of its impurities should be listed using their chemical and common names. This naming should include commonly used abbreviations (such as DDT) and trade names such as Baygon. The concentration of each substance should be listed. A hypothetical example might be: 10 percent solution aqueous ammonia, 80 percent water, 5 percent aromatic isocyanate, and 5 percent colouring and odouring agents—which also need to be listed.

If for reason of trade secrecy the exact amount of the component ingredients cannot be given in detail, each ingredient can be expressed as a percentage of the total, as can be seen above. Usually, producers of these substances will appeal to regulatory authorities to protect commercial secret but the authorities should still require that the

ingredients be disclosed if there is risk of toxicity or other hazard. It is not up to the employer or producer to dictate what constitutes private information that cannot be revealed to the public.

Below is a list of the ingredients of the MSDS. Those marked with an * are compulsory, those marked # should be included if relevant to the hazard level, while those marked *** are additional requirements.

While the list may look scary, the language used is usually plain if not technical. By now, you should know what terms like “hazardous” and “respiratory hazard” means.

General Information

1. Company (producers name) *
2. Address *
3. Telephone number *
4. Emergency telephone number/s *
5. Fax number/s and email address/es ***
6. Contact person #
7. Designation or position of contact person #
8. Level of hazard according to local or international code/standard *

Identification

1. Product name *
2. Other names, including abbreviation *
3. Formula *
4. Manufacturer's product code *
5. United Nations Product Number or code Identification *
6. Chemicals Abstract Service (CAS) number *
7. HAZCHEM Code (if applicable in the country of use) *
8. Dangerous Goods Classification (if Dangerous Goods Act is in place in
9. Packaging group #
10. Poisons Schedule Number (if in place in the country of use) *
11. Emergency Procedures Guide *
12. Package Size and Container Type ***

Use

1. Major use *
2. Improper use and warnings *
3. Method of application *

Physical Description/Properties

1. Appearance (colour, texture, etc.) *
2. Odour #
3. Odour threshold #
4. Boiling point *
5. Melting/freezing point *
6. Vapour pressure *
7. Specific gravity *
8. Flashpoint *
9. Flammability limits *
10. Solubility in water *

Ingredients

1. Identity *
2. CAS number (see above) *
3. Proportion *
4. Other names *

Health Effects Data

1. Acute *
2. Swallowed *
3. Eyes *
4. Skin *
5. Inhaled *
6. Chronic (including cancer risk) *

Symptoms

1. Swallowed *
2. Eye *
3. Skin *
4. Inhaled *

First Aid

1. Facilities needed *
2. Swallowed *
3. Eye *
3. Skin *
4. Inhaled *

Advice to Doctor

Advice to Doctor (pre-employment medical examination, recommendation for check-up, baseline and regular testing protocols) *

Precautions for Use

Exposure standards (TLV or other) *

Engineering Controls

1. Engineering controls required *

2. Process modification #

3. Segregation of process from personnel #

4. Vessel containment (e.g., stainless steel tank required) #

5. Enclosures (bundling) #

6. Mechanical handling *

7. Recommended type of ventilation *

Personal Protection

1. Respirators *

2. Gloves *

3. Eye *

4. Clothing *

5. Other *

Flammability

1. Ventilation *

2. Fire hazard *

3. Earthing #

4. Ignition sources #

5. Special equipment *

6. Flameproofing #

7. HAZCHEM (see above) *

8. Extinguisher type *

Safe Handling Information

Storage and Transport

1. Location *

2. Construction *

3. Bundling #

4. Conditions (heat, humidity, etc.) *

5. Labelling *

6. Time limits for safe storage *

7. Changes in storage #

8. Containers/Packing #

- 9. Ventilation during storage *
- 10. Sunlight temperature and weather *
- 11. Dangerous goods class *
- 12. Incompatibilities *
- 13. State or territory regulations as they apply to this substance #
- 14. Special transport facilities #

Emergencies: Spills

- 1. Minimisation *
- 2. Precautions *
- 3. Clean-Up *
- 4. Disposal Methods/environmental considerations
- 5. Neutralisers *
- 6. Absorbents (materials that will absorb the spilled substance) #
- 7. Decontamination procedures #
- 8. Precautions *
- 9. Protective clothing #

Disposal

- 1. General *
- 2. Precautions #
- 3. Specific procedures #
- 4. Method #
- 5. Incineration or landfill #
- 6. Effects on environment *

Explosion Hazard

- 1. Hazards of use/storage #
- 2. Hazards of use storage *
- 3. Dangerous breakdown/combustion products *
- 4. Fire fighting recommendations
- 5. Personal protection *
- 6. Reactivity *
- 7. Fire extinguishing agents *

Other Information

- 1. Methods of monitoring *
- 2. References and other sources of information *
- 3. Toxicity or ecotoxicity (poisonous to the environment) #
- 4. Biodegradability *
- 5. Persistence in soil or water *
- 6. Safer substitutes *

Annex 2

List of Hazardous Chemicals or Substances

Cancer-Causing Agents in Industries Where Women are Employed

Industry or Process	Name of Cancer-Causing Agent	Use
Aircraft	beryllium cadmium dimethylhydrazine toluene diisocyanate	Aircraft brakes, fuel Electroplating Fuel additive Coatings
Beverages	cadmium dichloromethane	Solder to join edges of tins Decaffeinating coffee For extracting hops from beer
Cleaning	2-chlorophenol	Disinfectant, germicide
Clinical	bis (chloromethyl ether)	Accelerator in pathology tests
Cosmetic, Soap	acetaldehyde benzo chlorophenol carbon tetrachloride dimethyl sulphate 1,4 dioxane epichlorhydrin ethyl acrylate ethyl carbamate 1,2 propylene oxide	Perfumes Germicide For fragrance Perfumes, solvent For deodorant bath products and shampoo Solvent nail enamel For fragrance Helping other substances dissolve and as a co-solvent For fragrance
Dry Cleaning and Laundries	benzene carbon tetrachloride 1,2 dichlorethane tetrachlorethylene	Cleaning agent Cleaning agent Cleaning agent, aerosol Solvent and heating agent
Electronics	cadmium oxide dichloromethane hexachlorobenzene lead nickel carbonyl	Semiconductors Cleaning agents Electrodes, porosity controller Antimonial batteries Vapour plating
Food Processing	acetaldehyde dichloromethane ethylene acrylate ethylene oxide	Flavouring in butter and fruits Extracting agent for cocoa, fats, and spices Flavouring agent Flavouring

Industry or Process	Name of Cancer-Causing Agent	Use
Glass Manufacture	chromium	Colouring
	formaldehyde	Glass mirrors
	nickel	Colouring
	cadmium oxide acetaldehyde	Glazes For silvering mirrors
Hairdressing	epichlohydrin	Solvent nail enamels
Health Care	beta propriolactone	Vaccine, sterilant, plasma
	dichloromethane	Anaesthetic
	ethyl acrylate	Prosthetics, surgical tools
	ethylene oxide	Sterilant
Leather Tanning	benzene	Solvent and tanning
Footwear	chromium	Mildew and mould control
	1, 4 dichlorobenzene	Cleaning agent
	1, 2 dichlorethane	Cleaning agent
	resorcinol	Cleaning agent
Pharmaceuticals	many chemicals	
Photography and Photographic supplies	chromium	For fixing baths
	1, 2 dichlorethane	Fixing agent
	dimethylhydrazine	Mediating chemical
	formaldehyde	Hardening
Printing and Duplicating	resorcinol	Developer
	toluene 2,4 diamine	
	benzene	For inking lithography
Sports Shoes	1,4 dioxane	Wetting and dispersal
	toluene, benzene	Glues and hardeners in shoe manufacturing
Toy Manufacture	formaldehyde	Chrome printing
	cadmium	Electroplating
Yarn Thread and Fabrics	toluene diisocynate	Finishes, sealants
	methyl chloride	Dyes
	naphyl amines	Dyes
	anilines	Colouring agents

Substances Thought or Known to Cause Reproductive Hazards for Women

Acrylonitrile**	Disulfiram	Nickel**
Aluminium chloride	Dyes	Nitrogen Oxide
Aniline	Epidan 5 (epoxy)	Nitropropane
Arsenic	Ethoxyethanol	Nitrosamines
Azo Dyes	Ethyl Benzene	Organophosphates and organochlorines pesticides*
Benzene	Ethylene chlorohydrin	Ozone
Benz (o) pyrene	Ethylene dichloride	Pentachlorobenzene
Beryllium	Ethylene glycol monoethyl ether	Perchloroethylene
Biphenol A	Ethylene oxide	Phenol
Bromide	Ethylene thiourea	Photographic chemicals
Butyl Acetate	Fluorocarbons	Phthalate esters
Cadmium	Formaldehyde	Polybrominated biphenyls*
Caprolactam	Formamides	Polychlorobiphenyls
Carbon disulphide	Gallium	Propylene oxide
Carbon monoxide	Hexachlorobiphenyl	Selenium**
Carbon tetrachloride	Hexachlorophene	Solvents
Cellosolve	Lead	Styrene
Chlorodifluoromethane	Lithium	Styrene Oxides
Chloroform**	Mercury	Tellurium**
Chlorprene	Methylacrylate esters	Tetrachlorethane
Chromium	Methoxyethanol	Tetrachloroethylene
Copper	Methylazoxymethanol	Thiram
Dibutyl Phthalate	Methylazoxymethanol	Titanium
Dichloroethylene	Methyl cellosolve	Toluene*
Dichloromethane	Methylene chloride*	Toluidine
Diethylhexyl phthalate	Methyl chloroform	Trichlorethane*
Dimethylacetamide	Methyl ethyl ketone*	Urethane
Dimethylbenzanthracene	Methyl styrene	Vinyl Chloride
Dimthylformamide	Molybdenum	Xylene*
Diphenylhydrazine	Monomethyl formamide*	

Substances Thought or Known to Cause Reproductive Problems in Men

Acrylamide	Chlorprene	Epoxy Resin
Allyl glycidyl ether	Chromium compounds	Ethers
Arsenic*	Copper	Ethylene Dibromide and Dichloride*
Benzene* and Chlorobenzene**	Di (2,3 exopropyl) ether	Ethylene glycol ethers
Benz (o) pyrene	Diethylhexyl phthalate	Ethylene Oxide
Bis (2 methoxyl) ether	Dimethylaminoepionitrile	Formamide
Bis (2 methoxyethyl) ether	Dinitrotoluene	Fluorocarbons
Boric Acid	Direct Blue	Freon 31 (chlorofluoromethane)**
Cadmium*	Dibromomethane	Glycidil Ether
Carbon Dioxide	Dibromopropyl phosphate	Hexachlorocyclohexane
Carbon Disulphide	Dibutyl phthalate	Lead*
Carbon Monoxide*	Diglycidil ether**	Lithium**
Carbon Tetrachloride**	Dichlorethane	Manganese*
Cellosolve	Dyes	
	Epichlorhydrin	

Mercury	Phthalate ethers	Toluenediamine
Methanil Yellow	Polybrominated biphenyls	Trichlorethylene*
Methoxythenol	Polychlorinated biphenyls	Triethylene glycoldiglycil
Molybdenum	Solvents	Tris
Nickel	Styrene oxide	Vinyl Chloride*
Paratertiary butyl benzoic	Titanium	Zinc Chloride**

* There is enough evidence to indicate this substance is hazardous to humans.

** Evidence in animals of reproductive disturbance, which means that humans should handle this product with great care and monitor outcomes in workers using this chemical.

Note that smoking has been found to be a reproductive hazard to both men and women. In men, it has been associated with infertility. Women smoking during pregnancy are known to have babies with low birth weights, subtle learning disabilities, and respiratory distress. Smoking may also enhance the effects of other reproductive hazards. Smoking parents are also a major cause of asthma to their children.

Effects of Selected Substances on Human Reproduction

Substances	Effects on Human Reproduction
Gases	
Carbon Monoxide	Increase in early rupture of the bag of water, increase in miscarriages and stillbirths, low birth weight, brain damage, retardation, fits, tight rigid muscles, premature detachment of the placenta (afterbirth) leading to reduced nutrition and oxygen to baby
Ozone	Increase in miscarriages and birth defects
Anaesthetic gases (nitrous oxide)	Increase in miscarriages, birth defects, low birth weight, infertility
Solvents	
Tetrachlorethylene	Jaundice in newborn babies (solvent from breast milk)
Toluene	Premature births, heart, facial, and nail defects
Gasoline	Facial defects, brain damage (very small brain) and retardation
Others (e.g., acetone)	Lack of a sacrum (the large, flat bone at the base of the spine which includes the tail bone)
Food Additives and Contaminants	
Calcium cyclamate	Cleft palate, split lips, hand deformities
Diethylstilbestrol	In female children, fatal cancer of the vagina, enlarged cervix and uterine defects; in male children, abnormal sperm, the testicles do not drop, cysts in the testicles
Zoapatanol	Miscarriages
Ergot alkaloids (fungus found in grains)	Miscarriages
Polychlorinated biphenyls (PCB)	Stillbirths, babies of affected parent/s are small for their age, stained skin, gum disease, jaundice, liver damage, nerve and developmental damage

Substances	Effects on Human Reproduction
Pesticides Organophosphorus (Carbaryl) Organomercurials Phenoxycetic acid (2,4,5,T) Organochlorines (DDT, DDE) Hexachlorobenzene Chlordecone Dibromochloropropane (DBCP)	Miscarriages, increase in various defects, foot deformities Testicular dysfunction Miscarriages, brain damage, lack of coordination Foot deformities, open spinal cord (Spina Bifida), miscarriages Prematurity Red urine in new born babies (from breast milk) Male infertility Male infertility
Metals Alkyl Mercury Lead Lithium Selenium Arsenic Nickel	Spastic muscles and severe brain damage (Minimata Disease), blindness, tremors, fits, lack of coordination, increased early infant death, bleeding disorders, babies of affected parent/s are small for their age Miscarriages, stillbirths, low birth weight, brain damage, blindness, eyes that continually shift from side to side, tumours made up of blood vessels, anaemia, bleeding disorders, prematurity, early infant deaths, decreased male and female fertility Heart problems in children born of affected parent/s Miscarriages, club feet Premature delivery and early infant death Birth defects and early infant death
Others Vinyl Chloride Chloroprene Toluenediamine Dinitrotoluene	Stillbirth, miscarriages Miscarriages, sperm abnormalities Male infertility Male infertility

Annex 3

Sources Of Illness at Work From Bacterial, Fungal, Or Viral Infections

The term “biological hazards” conjures up visions created by science fiction movies with strange and horrible creatures emerging from laboratories and the fiendish minds of national enemies. In fact, biological hazards are all around us. When we catch a “flu,” which is short for influenza, or diarrhoea, we have fallen prey to a biological agent that had entered our body. “Biological agent” means something that is living or that comes from something living. The reaction-causing agent often lives inside or alongside another living thing, such as a dog or is part of a plant or the hard shell or skin of something that died. What is sometimes known as hay fever—sneezing, runny noses, and eyes—is triggered by parts of living plants known as pollen, one of the reproductive parts of plants. During the dry season, pollens are caught up by wind currents and become airborne. Other minute fungal and animal organisms cause allergic reactions that make us reach for handkerchiefs. In some cases, severe asthma can be started by contact with something that triggers a very severe allergic reaction. Working with kapok, cotton, and grains that have been stored for periods of time, such as wheat and barley, can cause this type of allergic reaction. These materials contain creatures so tiny, which are not only invisible to the human eye but some are also really hard to classify as either animals or plants.

The tropical and semitropical zones of the world are like holiday playgrounds for bacteria, fungi, and other minute creatures. The moist climate makes abundant places to breed. In addition, poor nutrition, diarrhoea, and other chronic diseases of poverty, which can affect working women, mean that such infections can quickly overwhelm the woman’s body defences.

Listed below are some of the living agents that may influence women’s occupational health. The Department of Labour personnel often forget that women’s workplaces may involve bites from spiders, animals, and exposure to stuff in plants or animals (such as fur) that cause allergic reactions. This list may not be complete as it is based on research done in the West. The list of bugs that live in tropical zones that affect workers may be much longer than this one.

Bites from animals or insects are unavoidable in some occupations. Rats are also a danger, carrying disease in their urine as well as inflicting nasty bites. Spiders have been known to bite the necks or hands of palm oil cutters and handlers, and of those who cut and handle bananas. Little can be done to avoid this in the plantation. But at the processing or handling plant, workers could be given leather gloves to handle the products without risk of being bitten. A well-marked first aid kit with anti-venom (antidote for the poison) for the known local and nasty creatures is vital to all workplaces, such as plantations, where bites are a risk.

Rabies

Those at Risk: Anyone who routinely handles animals such as zoo attendants, laboratory workers, cleaners in laboratories, women farmers, tourism and national park guides who show tourists wild animals, veterinarians and veterinarian nurses. The good news is that rabies is becoming rarer now that vaccines are available.

How It is Transmitted: By bite from an infected animal.

Effects: This disease normally kills bitten workers, unless they can have immediate access to a vaccination after

the bite.

First signs of illness: Headache, nausea, and loss of appetite. These signs then progress to drooling (loss of ability to control saliva) and fear of water. Convulsions and death signal the end of this awful disease.

Prevention: Vaccination of animals if they are kept (as in a tourist park) and vaccination of workers. The vaccine should be made available at the workplace in case of a bite to an unvaccinated worker (or member of the public).

Milkers' Nodules

Those at Risk: Women who routinely come in contact with the infected teats of milking cows. This disease is most commonly found in small-scale dairies.

How It is Transmitted: The organism enters through cuts in the skin.

Effects: Small lumps on hands, sometimes on the face and neck. The lumps are caused when the lymph nodes, which are part of a parallel system to the blood system, become large and swollen. This is because the task of the lymph system is to filter infection. There also may be mild headaches, fevers, and feelings of being unwell.

Prevention: Treatment of infection of the udder (mastitis) in cows along with the use of soap, disinfectant, and clean towels for personal hygiene after milking.

Newcastle Disease

Those at Risk: Women working with chickens or birds in small-scale intensive chicken farming or in slaughterhouses.

How It is Transmitted: Breathing in dust from chickens or birds that carry the virus.

Effects: Watery, red, and itchy eyes, swollen eyelids (these effects may be confused with conjunctivitis), mild headache, and fever. The infected person may have a slight cough. The effects will eventually go away on its own.

Prevention: Well-ventilated workplaces and care in handling birds known to be infected.

Q Fever

Those at Risk: Women working in dairy farms, meat works, and slaughterhouses; wool and skin handlers and those who work with animal organs in plants that boil fat and organs to make other products such as animal feeds or soap.

How It is Transmitted: Workers inhale infected droplets from infected animal tissues. Direct contact with the flesh of infected animals may also cause infection. The small infectious organism is very tough and may survive for long periods.

Effects: Flu-like symptoms with rapidly developing severe chest disease, fever and headaches with loss of appetite. Later, the chest disease tends to become worse. Q fever is rarely fatal in healthy women. In cases where the disease continues untreated, heart complications may arise.

Prevention: Q fever is prevented by vaccination of workers.

Tetanus

Those at Risk: Anyone who works or lives around animals who suffer a penetrating or crush wound.

How It is Transmitted: Penetrating or crush wound allowing the bacteria to enter.

Effects: This is an acute disease, which affects the body quickly. The muscles of the jaw, neck and back become very tight and painful. The jaw really just lock up so the other name for Tetanus is lockjaw. Eating is impossible and the disease, if left untreated, may kill.

Prevention: Mass immunisation of the population with regular booster shots for those at risk. If a penetrating or crush wound occurs in areas where animals drop their dung, then vaccination is required immediately.

Anthrax

Those at Risk: Agricultural workers and those handling goat hair, lamb's wool, and hides of infected animals.

How It is Transmitted: Most cases are caused by the bacteria entering through small cuts in the skin. Sometimes it can enter the body through airborne particles that carry the bacteria.

Effects: A small, open sore begins to develop around the entry wound. Painless, the wound often becomes black, scabby, and swollen. Sometimes if the bacteria have been inhaled, respiratory flu-like symptoms develop. Fever and shock follow in untreated cases. Swollen lymph nodes appear in the groin, armpit, and neck. Death is common in those left untreated.

Prevention: All workers in risky industries have to be immunised. Washing facilities are important to prevention, as is ventilation of the workplace.

Brucellosis

Those at Risk: Meat packers and processors, and veterinary nurses.

How It is Transmitted: Through small cuts or scratches. In some rare cases, through inhalation of infected dusts or droplets from infected animals.

Effects: Flu-like symptoms with fever, headache, and muscle pain. The fever gets worse, normally striking at night, and is accompanied by weight loss and weakness. Complications include feeling suicidal, which can go on for 10 to 20 years if the disease is poorly treated or untreated. In addition, complications also include liver and kidney problems, point disease, abscesses in the spleen, and bladder problems.

Prevention: Women with cuts and scratches on their hands who handle meat need to be given gloves to work with. The workplace should be well ventilated. Any woman feeling ill with a night fever should be tested for brucellosis.

Candidiasis

Those at Risk: Dishwashers, cooks, bakers, chicken processors, meat packers, and food cannery workers.

How It is Transmitted: Candida albicans, the organism that causes candida, is normally found in the human body and in nature. Sometimes, other exposures allow the candida to reproduce out of control and cause illness.

Effects: The fungus candida albicans can cause sores to break out in the mouth, skin, and vagina and can spread or remain quite localised. Sometimes it will spread to warm, dark areas like under the breasts, into the armpits, lower abdomen, elbows, and between the fingers. If the worker had been ill or is diabetic, candidiasis can encompass more severe respiratory and heart complications that, if left untreated, can be fatal in a minority of cases.

Prevention: Gloves and ventilation of the workplace are the most appropriate preventive measures.

Chromoblastomycoses

Those at Risk: Women working in tropical areas that suffer lots of scratches on their legs and feet such as plantation or tea workers.

How It is Transmitted: Through the scratches.

Effects: A strange cauliflower-like outgrowth at the site of the wounds appears. These growths are full of fungi and if they grow out of control, they may obstruct the lymph drainage to the legs. These growths can be very disfiguring and are hard to get rid of unless treated early. The disease resembles elephantiasis.

Prevention: Wearing shoes and covering the legs with thick trousers.

Ringworm

Those at Risk: Women working in hot, damp environment such as food processing plants and animal hide factories.

How It is Transmitted: This is a superficial fungal disease of the skin, nails, and scalp transferred from other people or from animals.

Effects: The skin sores are circular and ring-like with a clear, dry area in the middle. Sometimes the ring is scaly and reddish. If it affects the nails, ringworm can cause the nails to disintegrate. If the infestation is on the scalp, the hair can disintegrate as well.

Prevention: Workers should be given soap and clean towels to wash after work. They should be given anti-fungal powder to dust the damp parts of their bodies such as armpits, groin, and between the toes. Towels should be sterilised by the contract laundry and not washed by the women workers!

Other Fungal Diseases

Those at Risk: There is a collection of diseases due to allergic reaction to the inhalation of fungal spores. Fungi reproduce by making and distributing spores. They are like seeds in some ways. Women who work in textile mills for instance may get byssinosis from inhaling spores from cotton or hemp fibre. Other workers at risk are those handling hay, farming mushrooms, sugarcane workers, cork and softwoods workers, and those making and packing seeds.

How Fungal Diseases are Transmitted: Inhalation of spores.

Effects: Usually the response is marked by respiratory problems such as cough, fever, and production of phlegm. Sometimes the attack resembles asthma in that the woman begins to wheeze and struggle for breath. Symptoms are often worse after a holiday or weekend rest, then reduce in severity over the week.

Prevention: Adequate ventilation to reduce dust levels in the air. Damp cleaning to suppress dusts and provision of respirators in cases where dust is thick.

Mites, Chiggers, and Ticks

Those at Risk: These tiny animals usually live on other larger animals. The illness comes from the eggs or even smaller parasites carried by these minuscule creatures. Sometimes the eggs hatch releasing the primitive creature known as larvae that feed on blood. These crawl up the legs of women working in fields, plantations, or farms, and attach themselves to the skin. Chickens for instance may carry these types of tiny creatures.

Those making brooms or those handling wheat, barley, straw or other grains and cereals may be infested. Workers handling copra, vanilla pods, and cheese are also at risk.

Route of Entry or Transmission: Through the skin.

Effects: There is a wide range of effects usually marked by the appearance of a bite mark on the legs that begins to itch and swell. The wound may become dusky red in colour and when pushed in, may take some time to return to its previous shape. Itching may cause loss of sleep and fever may occur. Secondary infection introduced by scratching the wound is common.

Some bites cause local dermatitis: a reddened, scaly, and itchy skin. The tick bite is dangerous only in some regions where ticks can cause severe fevers, weakness, and lack of body co-ordination. It is best to remove the tick using salt or a flame under the body so the tick does not leave its head in the wound.

Prevention: Fumigation of grains and cereals, and the use of repellents and protective clothing that covers all exposed areas of the skin.

Annex 4

Sample Checklists for Workplace Reform

These checklists may help you work out a methodical approach to analysing the existence of and solutions for workplace reform.

1. Sexual Harassment and Violence at Work

As this is an issue that arouses a number of difficult emotions such as fear and shame in women, and fear and denial in the men, it needs to be approached systematically like any other occupational hazard. Harassment is better dealt with in the context of a national or provincial legal system. If that does not exist yet, it is important to work with managers to develop company-based guidelines and procedures for complaint.

Note: These lists are far from complete. You may find things in the text of this book that can assist you to add to these lists.

Question	Yes	No	Comments
1. Is there a national legislation which bans sexual harassment and/or workplace violence?			
2. Does the company have a policy which bans sexual harassment or similar gender discrimination practices?			
3. Does the company have an appeal system in place if sexual harassment/ workplace violence occurs?			
4. Has there ever been any action taken against men who harass women?			
5. Do women feel free to report harassment?			
6. When women complain about sexual harassment, what do they mean by this? (i.e. could they mean rape?) What form does the harassment take?			
7. Have the women taken any measures to try to prevent recurrence of this behaviour?			
8. Describe what the women did and the response to that action.			
9. Have women taken time off work because of sexual harassment? If so, how many women and how many days?			

Question	Yes	No	Comments
10. Have any of the women fallen ill because of sexual harassment?			
11. What form does the illness take?			
12. Have any of the women resigned because of harassment?			
13. At any time has violence been associated with harassment?			
14. Is violence and sexual harassment widespread or confined to one or two identified persons?			
15. Is violence in the workplace a common occurrence?			
16. What form does this violence take? (Describe)			

Recommendations

1. For immediate action:

2. For long-term action:

2. Pregnancy and Work

Pregnancy can be a time of great joy and exhilaration. It can also be a time of fatigue, sickness, and aching bones. It is fundamental to women's human rights that their health be protected during their pregnancy.

The following checklist raises some of the important issues, many of which should be covered by national occupational health legislation.

Is yours a woman-friendly workplace?

Question	Yes	No	Comments
1. Does the company have a policy on employment and pregnancy?			
2. Does the company allow women to take maternity leave?			
3. Are women penalised for getting pregnant/taking maternity leave? (i.e. are they denied employment when they come back, denied promotions, wage increases, holidays, etc.?)			
4. Are pregnant women expected to work in areas that contain known reproductive hazards? (see list in this section)			
5. Are women allowed to transfer to other less hazardous work if they are pregnant? Is this done automatically or only if the women request transfer? Are they able to transfer without losing benefits or pay?			
6. Are all women, pregnant women in particular, expected to stand up all day?			
7. Are all women, pregnant women in particular, expected to sit all day?			
8. Are pregnant workers regularly expected to carry heavy loads—especially late into pregnancy?			
9. Are all women, pregnant women in particular, given free access to toilets?			
10. Are pregnant women given the right to rest if they feel weak or tired?			

Question	Yes	No	Comments
11. Does the company allow women to breastfeed babies at work?			
12. If no, would this be desirable?			
13. If yes, is there a suitable place for women to breastfeed free of noise, distraction, and hazardous fallout?			
14. Are women able to leave work to attend clinics for ante-natal care, for instance, to obtain iron tablets?			
11. Is there a polyclinic available on site at which women can obtain ante-natal care, including iron supplements?			

Recommendations

1. For immediate action:

2. For long-term action:

3. Checklist to Survey Workplace Housekeeping

Women all over the world take pride in keeping their homes clean, neat, and safe. Women have in their minds the health and safety of themselves and their families as they dust, wash, and sweep. It is a task that has typically fallen to women and thus, has been trivialised by men as being non-status activity. But as women, we know that housework is one of the very foundations of family health.

But some employers do not share that pride and women, whose homes are spick and span, sometimes have to work in messy, dirty, and chaotic factories. Piles of rubbish lying next to doorways, cables and grease on the floor, spilt chemicals and other mess make working life unpleasant and unsafe.

The checklist below will help you identify some of the housekeeping problems commonly found in workplaces. It's not up to you to take up mops and brooms. Instead management should ensure that they employ cleaners and that all the hazards mentioned below are kept under control through provision of adequate storage and improved workplace practices and education.

Could your workplace win a good housekeeping award?

Question	Yes	No	Comments
1. Are entrance ways clearly marked and kept clear of rubbish and materials?			
2. Are workrooms kept clean and tidy with bins provided at regular intervals for rubbish?			
3. Are women's bags and personal belongings stored safely in lockers?			
4. Are all materials safely stored on racks, pallets or in labelled cupboards?			
5. Are floors regularly cleaned to remove grease or other hazards?			
6. Is the floor littered with cables and other things that can cause falls?			

Question	Yes	No	Comments
7. If the workplace has a kitchen or eating area, is it clean and well-ventilated? Is there a refrigerator to keep food and drinks cool and fresh?			
8. Are all tools stored in appropriate racks when not in use, and are they regularly maintained and sharpened?			
9. Are all shards and sharp-edged waste quickly removed from the workplace?			
10. Are the floors well- maintained to reduce holes and unevenness?			
11. Are there rodents or other unwelcome animals in the workplace?			

Recommendations

1. For immediate action:

2. For long-term action:

4. Fire Prevention and Fire Safety

Is your workplace hot on fire safety?

First line responsibility for fire safety belongs to the management who should work with the local fire authority to put in place fire prevention mechanisms and evacuation training.

But management may need some prompting from women workers, so work your way through this checklist to see if you need to get hot under the collar about fire safety.

Questions	Yes	No	Comments
1. Does the company have a fire prevention and safety policy?			
2. Does the company hold annual fire and evacuation drills?			
3. Do the premises have regularly -placed fire extinguishers?			
4. Can women handle the fire extinguishers easily?			
5. Are the women workers trained in the use of fire extinguishers?			
6. Are the extinguishers suitable for the types of fire you are likely to have (check on the side of the extinguisher)?			
7. Are the extinguishers regularly checked by fire service officers?			
8. If extinguishers are not in place, what other facility does the company have for fighting fires? Can the women use these systems?			
9. Does the place have clearly-marked fire exits?			
10. Are the fire exits routinely locked? (Who has the key?)			
11. Check the fire exit. Is it free of obstruction on the outside? Where does it end up? Is there room for all the workers if they have to escape the building?			
12. If the building is multilevel, are the fire exits well-lit?			
13. Is the workspace fitted with smoke detectors?			
14. Are areas where flammable chemicals are used clearly labelled with no smoking signs? Is this enforced?			

Questions	Yes	No	Comments
15. Have you ever had a fire at work? What happened? Has anything changed since then?			
16. Are flammable chemicals stored in small quantities in metal cupboards?			
17. Are all flammable chemicals clearly labelled as such?			
18. Are all exits clear of rubbish and stored materials?			

Recommendations

1. For immediate action:

2. For long-term action:

5. General Safety at Work

Maintaining workplace safety has traditionally been the work of men since the practice of occupational health and safety began with an understanding of machines and basic design skills. However, in essence, safety is a matter of common sense, a major attribute of women!

Does your workplace have safety sense?

Questions	Yes	No	Comments
1. Does the company offer safety and health training to all new workers?			
2. Are women given specific training in safe work methods for their particular task?			
3. Does the company have a policy on safety at work?			
4. Are women told about emergency procedures in case of personal accident or damage to machinery?			
5. Are all accidents routinely investigated?			
6. Are all accidents reported to the national or provincial labour offices?			
7. Are all machines fitted with guards to prevent fingers, hands, hair, or toes from entering?			
8. Are all machines and hand tools used by the women regularly checked?			
9. Are cables and electrical fittings all kept out of the way and regularly inspected to reduce risk of electrocution?			
10. Are all raised platforms and stairways fitted with rails to prevent falls?			
11. Are the areas in which forklifts operate clearly marked? Can you hear the approach of a forklift?			
12. Are all areas requiring protective clothing marked as such? Is the use of protective clothing enforced?			
13. If the work involves dangerous chemicals, are there eye wash stations or emergency showers provided?			

Questions	Yes	No	Comments
14. Do workers have regular medical check-up at company's expense?			
15. If power presses are used to stamp out components, are two hands required for the operation to minimise the chance of getting fingers caught?			
15. Are all vats, bins, and other areas large enough for women to fall into protected with guardrails?			

Recommendations

1. For immediate action:

2. For long-term action:

6. General Environment

In the late 1960s, the Swedish government launched a concept called Quality of Work Life, recognising that many people spend over half of their daily lives at work. They believed that this experience should be life-giving and enjoyable, not just a tough time to endure. They assumed that if work were enjoyable and satisfying in all respects, then the worker would be productive and healthy. In later years, their ideas were found to be true for all levels of the workforce: from the boss to the gardener.

In the past 10 years, much of the Swedish government's work has been forgotten or ignored in search for higher profits.

However, the focus on working life issues lingers in occupational health and safety practice. Below are a few more questions in a checklist which considers the wider work environment.

Question	Yes	No	Comments
1. Is the work area well-lit?			
2. Is the temperature inside always comfortable?			
3. Are the premises painted with a pleasing colour?			
4. Is adequate cool drinking water available?			
5. Are the toilets kept clean and tidy?			
6. Is there a place to wash or dispose of menstrual products?			
7. Are soap and towels provided?			
8. Are general washing facilities available?			
9. Are workers provided with uniforms?			
10. Are workers expected to wash their own uniforms?			
11. Is a fully stocked first aid kit available in the workplace?			
12. Is there anyone trained in first aid?			
13. Does the company provide nutritious meals?			
14. Is music allowed in the workplace?			
15. Does the enterprise stage social events such as sports or concerts which allow women to meet informally?			
16. Is there a pleasant and hygienic place to eat?			

Recommendations

1. For immediate action:

2. For long-term action:

7. Ergonomics: Standing Work

Workplace design is one of the most overlooked and underestimated preventive strategies in occupational health. The checklist below is designed to analyse work performed while standing. The active participation of women in workplace redesign is vital: they know if they are uncomfortable while they are working and may have some very good suggestions as to how the workplace can be changed to make work easier to accomplish.

Question	Yes	No	Comments
1. Can the work be done while sitting or by a combination of sitting and standing?			
2. Does the work require the woman to stand in a fixed position?			
3. Do they have to bend and twist into uncomfortable positions?			
4. Does the work require the women to stand for long periods of time? How long?			
5. Do the women have to stand to reach machine controls? If the machine was redesigned, could the job be done sitting down?			
6. Do the women have to lean forward for long periods of time?			
7. Do workers complain of back pain?			
8. Do workers complain of aching legs?			
9. Is the floor made of cement?			
10. Has the company provided softer floor mats such as those made from ribbed rubber or carpet to prevent leg fatigue?			
11. Is there adequate space between workers to allow free movement?			
12. Are footrests provided?			
13. Does the work demand that women work with their arms reaching high overhead or above their shoulders?			
14. Would it be possible to make the worker "taller" by providing high chairs or raised duckboards?			

Recommendations

1. For immediate action:

2. For long-term action:

8. Ergonomics: Sitting Work

Question	Yes	No	Comments
1. Does the work chair/ stool have a back rest?			
2. Is the work chair/stool adjustable?			
3. Do the women know how to adjust the chair/stool and why it is important to work at the right height?			
4. Is the working chair/stool stable and not easily tipped over?			
5. Are women expected to provide their own cushions?			
6. How long are women expected to sit at one time?			
7. Can the women put their feet flat on the ground while they are sitting?			
8. Can they vary their working positions?			
9. Is the height of the working surface at level with women's waist when they are sitting?			
10. Do they have to frequently twist and bend to reach components or store completed goods?			
11. Do women complain about arm, shoulder, neck or hand pain?			
12. Are women doing assembly work provided with gravity feeder boxes so that they don't have to reach?			
13. Are the machine's stop buttons within easy reach?			

Recommendations

1. For immediate action:

2. For long-term action:

9. Ergonomics: Lifting and Carrying

Question	Yes	No	Comments
1. Are women required to repeatedly lift heavy loads (more than 15 kg) on their own, without help?			
2. Do the loads have to be lifted from the floor?			
3. Are the loads unstable or bulky (for instance, bales of rubber or cotton)?			
4. Is it hard to see when handling the load?			
5. Is the floor area where loads are handled greasy or uneven?			
6. Are carts or trolleys with wheels available to assist with load carrying or handling?			
7. Do loads have to be lifted to height (head level or higher)?			

Recommendations:

1. For immediate action:

2. For long-term action:

10. Handling and Storage of Chemicals

Exposure to some chemicals can cause illness. Some people think that the stronger the smell the more dangerous the chemical. This is not always the case and some chemicals that have virtually no smell can be very dangerous.

While our nose is a good detector of chemical presence, we also get used to chemical smells. When working with chemicals, we have to pay attention to all sorts of handling and work design principles. This checklist will help you assess if your workplace is a chemically safe zone.

Question	Yes	No	Comments
1. Do you know if the national or provincial regulations regarding chemical storage and handling are adhered to by the company?			
2. Does the company keep a register of all the hazardous materials being used or produced in the factory?			
3. Is this register accessible to the women workers?			
4. Does the register define all those chemicals being used that may cause reproductive problems to men and women working in the factory?			
5. Is specific handling data (Material Safety Data Sheets) available to all workers?			
6. Is the workplace well- ventilated?			
7. Have any women complained of illness (feeling dizzy, nauseous, headaches, etc.)?			
8. Are all hazardous chemicals labelled with the correct international hazard symbol?			
9. Do they have handling and poisons information on the label?			
10. Are all women trained in the safe use of chemicals?			
11. When handling chemicals, are all women given aprons, gloves, face shield, or goggles to wear?			
12. Are antidotes to poisons available in the workplace? Who is trained to administer them?			
13. Are all women handling chemicals given annual check-ups with specific tests given for specific chemicals?			

Question	Yes	No	Comments
14. Is each area where chemicals are handled equipped with eye wash stations and emergency showers?			
15. Are the workplaces regularly monitored for fume build up? Are the ventilation systems regularly maintained to make sure they effectively ventilate fumes?			
16. Are all chemicals stored in suitably marked metal cupboards?			
17. Are large amounts of flammables stored outside?			
18. Are there suitable extinguishers present in case of chemical fires?			
19. Are you aware of women having reproductive difficulties, for instance, difficulty in getting pregnant, miscarriage or birth defects?			
20. Are you aware of women from one factory being affected by the same type of cancer?			
21. Are acids stored safely (below eye height and with tops securely put on) and at a distance from any alkalis?			
22. Under normal circumstances, are all chemical spills immediately cleaned up?			
23. Are all containers routinely kept closed to prevent escape of vapour?			
24. Are all episodes of chemical poisonings and illness reported to the national or provincial authority?			

Recommendations

1. For immediate action:

2. For long-term action:

11. Noise

Many women think that noise is just a fact of life. This is, after all, a noisy world we live in, with loud music, traffic, and aircraft noises flooding our lives. But being around loud noise can cause deafness.

Things can be done to reduce noise at work. Women have to show that the place is too noisy and have few suggestions to management. Measurement of just how loud the noise really is requires specialised equipment. But the following questions will assist you to know if the noise at work is excessive.

Let's bring peace to this noisy world.

Question	Yes	No	Comments
1. Is the noise so loud that workers cannot hear each other without shouting while standing at an arm's length?			
2. Do the women suffer ringing or buzzing in their ears when they go home at night?			
3. Does the ringing or buzzing disturb their sleep?			
4. Is machinery regularly maintained to prevent machines from "running rough?"			
5. Does the noise come from one or two distinct sources or is it more general?			
6. Do the women have regular (annual) hearing test?			
7. Are the women given hearing protection?			
8. Are they given training and education about hearing conservation?			
9. Have engineers been asked to measure the noise in the factory? What are the results?			
10. Has there been any attempt to reduce the noise?			

Recommendations

1. For immediate action:

2. For long-term action:

Annex 5

When the Heat Is On - Work and Body Comfort in High Temperatures

Tourists come to the tropics to laze like lizards in the heat. Along with souvenirs and lots of photographs, they hope to take tanned brown skin back home as a mark of a successful holiday in the warmer parts of the world.

While being on holiday in hot climates may be fun, working in a hot climate is not. The body's mechanisms that maintain constant body temperature find it harder to maintain the body's temperature in tropical, humid conditions. Dress codes in some countries, particularly in Islamic countries, do not allow women to wear clothing that bares large areas of skin, thereby inhibiting the body's most effective temperature control mechanism - evaporation by sweating.

Many places where women work are intolerably hot. Little attention is given to this feature of the work environment because hot is assumed as "normal." But let's look at some of the features of heat at work and how it affects the human body.

The Hot Body

The human body can be compared to a medium efficiency machine. It consumes fuel and produces heat, but can only control the internal heating process for short periods—and inefficiently at that. When asleep, the body still produces heat enough to keep the healthy body temperature at 38°C.

Our evolutionary history shows that our ancestors wore few clothes (skins and grasses, in fact) and any fast, heat-producing activity was limited to hunting and war-related activities. Thus, we have not as a species had to deal with hard work in hot conditions until recently. Farmers, though working hard, usually begin work before sunrise and take it up later in the afternoon, resting in the heat of the day. Factories do not choose their working hours as prudently. Hard work sends the body's temperature up to the point where it has to begin to seriously control its internal environment. The body has a critical range of less than 2°C only before it begins to experience symptoms of physical stress. The rate at which blood is pumped to the skin surface to lose heat increases as the body's internal heat increases.

The body reduces its heat load in a number of ways:

1. **Conduction:** The heat moves from one source to another—like a saucepan carrying heat from a flame to the water inside. Heat from the body can be passed to the water if the woman takes a bath for instance. But this is the least important control mechanism as it is highly unlikely that workers can regularly swim or shower at work!
2. **Radiation:** The body radiates heat. You can feel the heat coming from a hot person's body. This is only successful as a means of reducing body heat if the outside temperature is cooler than that of the body. In many workplaces, this isn't the case.

3. **Convection:** Fans blowing cool air over the surface of the exposed skin will also cool the body, as those living in tropical zones know. But you probably didn't know that it was called something as fancy as convection.
4. **Evaporation:** This is the most important form of body cooling and is made possible by the body's sweat being exposed to air and becoming cooler.

Evaporation is the most important method of body cooling, as it is the most efficient. The evaporation of 100 ml of sweat by exposing the skin to air is as efficient as eating ice or drinking 1.6 litres of cold water.

On the Other Hand - Playing It Cool

In cold conditions, such as those found in cold storage areas or food packing plants, the challenge is to hang on to the body's heat without it being lost into the environment. If the body becomes too cold it begins to shiver—a muscular reaction that produces heat and gives warmth to the body. Shivering is a warning sign and should prompt the worker to wear warmer clothes, move to a warmer place or work faster to increase body heat. At work, it is important to demand more suitable clothing if you continually shiver at work.

Some Like it Hot

When the working environment heats up, more blood is pumped to the skin surface and more blood vessels open up, which makes the skin feel hotter, look redder, and maybe sweatier. Efficient cooling requires that the sweat on the skin be evaporated—not drip off the skin or soak into clothing. If humidity is high, then increased air movement is required to effectively evaporate the sweat.

Too Hot to Handle

Under extreme conditions, the surroundings may be hotter than the body so heat loss by radiation is negligible. When the air temperature in the workplace is higher than the body, the body gains heat from the air rather than being able to lose it to the environment.

When the body's abilities and mechanism to keep cool become ineffective, then the body's coping balance is under threat. Sweating becomes profuse. But in hot places, this is useless as the sweat cannot cool the body down. The body's temperature rises and will continue to rise unless the person is taken outside, or her clothes are partly removed to allow sweat to evaporate. The major threat occurs when the body temperature rises to 39°C. At this temperature, people begin to show symptoms of distress that vary between individuals. Some feel that they are very hot and burning up, while others may feel dizzy and weak. Others suffer visual distortion, headaches, nausea, muscle cramps, breathlessness, and rapid heart beat. Some become irrational and violent. If the body temperature continues to rise, death will ensue.

How Hot is Hot - The Ideal Temperatures for Working

Western regulations state that the inside temperature of a factory should not exceed 25°C for

work done sitting down, but is limited to a maximum of 22°C for work requiring hard physical effort. Some experts believe this should be reduced to 18°C because hard work drives up the body temperature.

Added to this are the effects of humidity—the higher the humidity, the lower the internal factory temperature should be. The optimum is 18°C for high humidity workplaces; for instance, laundries, tanneries, and dye works.

Acclimatisation

This is a term used to indicate that someone has become used to a situation. Many women in the Majority World are acclimatised to heat but the addition of a new heat-producing machine to the work environment, the wearing of hot synthetic clothing in conditions of high temperature and humidity, pregnancy, or illness with fever may tip the balance from acclimatisation to illness known as heat stress.

Water! Water!

Water is one of the most important forms of insurance against the ill effects of heat. Sweating causes the body to lose large amounts of water and salts that need to be replaced. Salt tablets are not necessary and can make people ill. Instead, the provision of cool, not cold, water is vital. Water dispensers should be placed strategically around the factory so workers can drink small amounts regularly.

Keep a Cool Head

How can factories maintain a comfortable temperature level?

First of all, it is impossible to please all people all the time. The best we can hope to achieve is a happiness rate of 80 percent.

1. Insulate roofs. Fibreglass bats are cheap and plentiful and they reduce heat by about 8°C.
2. Lag (cover with insulating materials) all hot pipes and machinery.
3. Ventilate all heat-producing machines.
4. Plant trees around the factory to reduce radiant heat.
5. Cover windows with reflecting film and with canvas blinds.
6. Remember that hot air rises and all extraction fans should be placed at height to be most effective.
7. Air condition very hot areas.
8. Use overhead ceiling fans for maximum effectiveness.
9. Provide water coolers at regular and reasonable distances.
10. Ensure that workers have only limited exposure to very hot areas. Hard physical work, which elevates body temperature, should only be permitted in short bursts if the climate

- is particularly hot and humid.
11. Ensure that workers dress appropriately for every type of condition and work. Overdressing in synthetics leaves women workers open to heat stress. Muslim workers should be encouraged to wear loose cotton clothing that can be easily pushed back to expose skin for evaporative cooling in case of collapse.
 12. Ensure that overweight workers or those with high blood pressure do not perform hard arduous, work for periods in excess of 10 minutes, as they are more susceptible to heat stress.

Summary

While women in the Majority World may be used to living and working in hot conditions, they have been more in control of the pace of traditional forms of work. Modern factory work brings with it a change in work practice or in the physical conditions of work, which may disturb the balance of women's ability to cope with heat. Controlling heat sources at work is comparatively cheap and is vital for women's health and comfort.

Annex 6

Some Common Industrial Chemicals and their Effects on the Body

This list contains only a small number of the dangerous chemicals that have been produced and studied. There are lots of others which we know very little. Their effects on the body are varied: some can be quite subtle, with the changes taking place over a long time, or suddenly and dramatically. A complete list of dangerous chemicals would be a book in itself—in fact, there are huge books just about these chemicals that take a lot of strength to lift!

The most important thing for women workers to remember is to keep systematic information about the chemicals they work with: take note of all the names of the chemicals, when and how you use them (regularly, all the time, rarely, etc.) and any reactions that may be shared by women working with these substances. Some of the chemicals listed below have really serious and long lasting effects on the human body. Some, for instance, cause cancer. So, therefore, prevention is much more effective and certain than cure.

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Acetonitrile (methyl cyanide)	Extraction of animal and vegetable oils; pharmaceuticals, also used as an industrial solvent	Inhalation; skin absorption; ingestion	Lungs and nervous systems; eyes through irritation	Tightening in the chest, flushing in the face, irritation of nose and throat; signs of serious poisoning include nausea, vomiting, shallow breathing, weakness, and headache	Measure cyanide and thiocyanate levels in the blood Those with a history of fainting or convulsions (fits) may be at extra risk
Acrylamide	Used in sizing for fabrics and paper industries; dyes; glues	Inhalation; skin absorption	Nervous system; skin	Cancer risk: fatigue, dizziness, confusion, damage to peripheral nerves (pins and needles), wobbly gait, slurred speech, excessive sweating	Currently, there is no routine system for monitoring the effects
Acrylonitrile	Plastics, synthetic fibre production glues, fumigation, nitrile rubber production	Inhalation and skin absorption	Affects the way the cells work; skin and eye irritation	Cancer of the brain, tumours, lungs, and bowel; eye irritations; prolonged skin irritation due to prolonged use; nausea; vomiting; sneezing; weakness; light headedness	Levels of cyanides and thiocyanates found in the blood

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Ammonia	Paper and pulp factories; chemical industries; those using refrigeration; fertilisers; dyes; glue makers; synthetic fibre making; rayon making; pesticide industry; plastics; electroplating; metal powder processors; detergents and cleaning agents	Inhalation of gas, skin contact	Upper respiratory tract; eyes; wet skin	<p>Contact with liquid ammonia is intensely irritating to the eyes, the inside of the mouth, nose, and skin. Eye symptoms can be very severe and long lasting including ulceration and blindness</p> <p>Mild exposure results in headache, producing lots of saliva, burning of the throat, coughing, vomiting, and pain in the middle of the chest. Longer exposure to ammonia gas is accompanied by bronchial spasm, and rapid swelling and watery lungs</p>	People with pre-existing eye diseases may be at greatest risk. Periodic examination should evaluate eyes, skin, and respiratory system. This should be done each year. Medical checks should be performed at time of hiring for later comparison.
Arsine	Semiconductor manufacturing; paper makers; fertiliser plants; dye works	Inhalation of gas	Blood	As a gas, it can kill in high doses. It destroys the blood cells so the worker feels dizzy, afraid, experiences headache, shivers and has stomach pain with vomiting, blood in urine, yellowing of skin, either lots of urine or lack of it	Test for arsenic in the urine
Benzene	Chemical industry; detergents; pesticides; solvents; paint remover; dyes; rubber	Inhalation of vapour; some absorption through the skin	Blood formation; nervous system; skin	Cancer of the blood-forming bone marrow (leukaemia); slowness in reaction; irritability; anaemia; dermatitis	Levels in urine of breakdown product; blood tests
1,3 Butadiene Otherwise known as vinyl ethylene or methylallene	Synthetic rubber; plastics; resins	Inhalation of gas or vapour	Eyes, nose, throat and nervous system	Great risk of fire and explosion; irritation of the nose, throat and eyes; dermatitis and frostbite may result from skin contact. In higher concentrations, this chemical is a narcotic causing drowsiness; cough, fatigue, loss of consciousness. Blood changes have also been noted and disease of the liver	Blood tests

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Carbon Disulphide	Rubber; textile industries; match factories; manufacture of chemicals, paints, fuels, varnishes, electroplating, rayon making; dye making; oil extraction plants; and dry cleaning plants	Inhalation, skin absorption of liquid	Nervous system; reproductive system; skin; heart; circulation; kidneys	Carbon disulphide has been associated with occupational cancer. Rigidity of walk and face; craziness; suicidal feelings; loss or disturbance of sensation in legs and arms. Kidney failure with disturbance of urine flow; high blood pressure and hardening of arteries; loss of menstrual periods; stomach ulcers; other profound changes to the body's chemistry	Analyse blood, urine and exhaled air for presence of carbon disulphide
Carbon Dioxide	By-product of ammonia production; used to make fizzy drinks; used in refrigeration as "dry ice"	Inhalation of gas or skin contact	Lungs; skin; eyes; and nervous system	Feelings of suffocation; restlessness; fits/convulsions Frostbite, if dry ice in contact with skin, raised blood pressure and heart rate. May damage the retina	
Carbon Tetrachloride	Dry cleaning and laundries; fumigation work; pesticide manufacture; metal cleaners; varnishing and furniture finishing	Inhalation	Liver; kidneys; nervous system; and skin	Dermatitis; kidney damage that shows as reduced urine output or profuse urination; fleeting eye irritation; liver disease; nausea; vomiting; abdominal pain; blood in urine in extreme cases	Analysis of exhaled air and blood
Chlorine	Paper and textile bleaching; water disinfection; chemical (bleach) manufacturing; metal fluxes; chlorinated solvent making; dye making; flour bleachers; laundry; rayon and plastics manufacturing; disinfectants and detergent making	Inhalation of gas	Middle respiratory tract. Some evidence that chlorine derivatives, such as the organochlorines manufactured from chlorine gas and liquids, can trigger breast and other cancer.	Chlorine reacts with the wet surfaces of the body (such as eyes and mouth to form acid) so, it is very irritating to the skin, eyes, and mouth. It may also corrode the teeth. High concentrations may cause the breathing system to close down and the worker is unable to breathe.	Chest X-ray and tests of breathing capacity; examination of teeth, heart and skin

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Chlorinated Hydrocarbons including DDT heptachlor, chlordane (Kepone) aldrin, dieldrin, uridine, endrin, lindane, toxaphene	Pesticides	Ingestion; skin absorption; inhalation of vapours	Nervous system	Stimulation or depression of nervous system: fine shakes, slurred speech, inability to sleep, restlessness Mild poisoning also causes nausea, vomiting and stomach pain; weight and appetite loss; severe poisoning can lead to convulsions (fits), stiffening of muscles (a flat unemotional face), coma, and death	These chemicals can accumulate in the fat and can be measured in the blood or urine.
Dioxane (not dioxin)	Detergent and deodorant factories; paint and varnish industry; food industry (processing oils); dye making and using; textile processing; printing industry; wax production for floors and furniture	Inhalation; through skin absorption	Skin; nervous system; kidneys; liver	Drowsiness; dizziness; loss of appetite; nausea; vomiting; coma unless removed; dermatitis; kidney and liver damage; thought to cause cancer after long-term exposure	Regular medical checks to detect any damage to kidneys and liver and to inspect skin. Any sign of dizziness or nausea indicates that airborne levels are much too high.
Dimethyl Sulphate	Drug and perfume manufacturing; dyes and chemical production	Inhalation; skin absorption	Skin; eyes; upper respiratory tract; nervous system at high doses	In liquid, this can be very irritating and can cause a rash and lack of sensation on the affected skin areas. The scar can take a long time to heal. Runny nose and eyes; swelling in the mouth; sore throat and hoarseness Contact with eyes can produce damage and sensitivity to light. Higher and long-term doses can result to difficulty in breathing, drowsiness, temporary blindness, and slow heart rate. Those who have had long-term exposure to Dimethyl Sulphate tend to be more sensitive to lung infections.	Chest X-ray; periodic examination of skin, eyes, nervous system, and lungs

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
p-Dichloro-benzene	Deodorant, disinfectant and insecticide industries	Inhalation of vapours and particles	Eyes; nose; lungs; liver; kidneys	Badly running and irritated nose; cough and lung irritation; liver damage with yellowing of skin; loss of appetite; nausea; damage to kidneys; Suspected of causing cancer of the liver and kidneys	Urine tests
Dibromochloro propa (DCP) This chemical is banned in much of the western world because of its toxicity and cancer-causing properties.	Factories making snail killers	Inhalation; skin absorption	Nervous system; eyes; nose; throat; reproductive system; lungs	Nausea and drowsiness; extreme irritation of eyes, nose, and throat; kills sperm; can cause water in the lungs. Cancer causing	
Ethylbenzene	Plastic industry (styrene); rubber and glue making	Inhalation; through skin absorption	Eyes, nose, skin; nervous system; liver;	Low-level exposure can cause dermatitis. High exposure may produce irritation of the upper respiratory tract, nose, and mouth. If the worker is not removed, she may die after cramps, convulsions, and paralysis of the respiratory centre in the brain. Long-term exposure tends to reduce the ability to perform fine manipulative tasks and cause slowness of reactions.	

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Ethylene Oxide	Sterilisation of medical equipment; fumigation processes; making of such chemicals as household detergent and disinfectants; factories, used as a textile fumigant	Inhalation	Skin; eyes; respiratory tract; nervous system	Dermatitis, but if contact is made with moist skin the chemical can cause burns and blisters. Ethylene oxide is also absorbed by leather and rubber and can cause severe irritation and burns if the clothing is left on. Large concentrations in the air can lead to eye irritation. Breathing large concentrations can lead to nausea, vomiting, irritation of the nose, throat and lungs. Cancer and birth defects, infertility and possible miscarriage are suspected to be the effects of this chemical.	Medical tests should be done regularly to assess any ill effects to respiratory tract, nervous system, liver, kidneys, and blood.
Ethylene Glycols (including cellosolve, cellosolve acetate, and methyl cellosolve)	Used to make paints, lacquers and varnishes, perfumes, dyes, and inks; also used in making glues, as dry cleaning fluids; used by plastics and tobacco workers, nail polish makers, used in cellophane sealers, and film processing	Inhalation; skin absorption	Reproductive system; kidneys; liver; nervous systems; blood; lymphatic systems	Fatigue; nausea; headaches; loss of appetite; eye irritation; respiratory tract irritation; Sometimes vision can become blurred for some time. High- level exposure can result to water in the lungs, and severe kidney and liver damage. Shaky hands and anaemia are also common symptoms. Long-term exposure can result in brain damage and loss of consciousness.	
Formaldehyde	Used as disinfectant, and preserving bodies in funeral halls; used by textiles, rubber, resins, deodorant and cosmetic workers; used by tannery workers, in latex factories, by dyes and inks makers; paper industry	Inhalation	Skin; eyes; lungs	Causes irritation and contact dermatitis; eye irritation; asthma; coughing and difficulty in breathing when inhaled in high concentrations	Patch testing of skin for allergic response

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Hydrochloric acid	<p>Chemical manufacturing; electroplating; tanning; pickling food; rubber; photographic industries; textiles</p> <p>Bleaching; food processing; dyes; plastics; soaps; battery making; edible oils; artificial silks; plant fertilisers</p>	Inhalation of gas or mist	Upper respiratory tract (nose, throat); eyes and skin	High concentrations may cause ulcers in skin or other wet skin surfaces such as inside the mouth or nose. Damage to the eyes may occur on contact. Long-term exposure can lead to severe irritation and water entering the lungs and bronchitis. May discolour teeth.	Chest X-rays need to be taken in cases of over exposure and acute illness. Regular medical checks for teeth, skin, and breathing function
<p>Isocyanates, including: TDI (toluene diisocyanate), MDI (methylene diisocyanate), Hexamethyl diisocyanate and others</p> <p>This was the gas that leaked and caused the deaths and damage at Bhopal.</p>	Plastics manufacture particularly polyurethane for shoe inserts, upholstery cushions, etc.); pesticides; coatings for wire; rubbers; paints and textile finishes	Inhalation of vapour	Eyes; skin; respiratory tract	<p>Asthmatic reaction; chronic bronchitis and water in the lungs; Nausea, vomiting and stomach pain may occur. If liquid TDI comes in contact with the skin, it may cause redness, blistering and swelling. TDI in the eyes can cause permanent damage if left untreated.</p> <p>Low-level exposures over long periods result in cough, wheezing, and shortness of breath. Decreased lung function is commonly associated with isocyanate workers.</p>	Regular medical checks focusing on lung function are vital. Chest X-rays and lung function tests

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Ketones	Textiles; pharmaceuticals. Chemical industry; used by resin and lacquer workers, glue makers, dye workers and dye makers, shoe workers, furniture finishers, cosmetics workers (nail polish), synthetic rubber workers	Inhalation; skin absorption	Skin; nervous system; nose; throat; eyes	Dry scaly dermatitis, irritation of throat and eyes, loss of consciousness, light headedness, dizziness, drowsiness, lack of co-ordination	Ketone levels in blood, urine and in exhaled air
Methanol	Used in paint varnishes, cements, inks and dyes (for straw hats) and in the production of formaldehyde; used to remove wax (batik industry), in the manufacture of photographic film, plastics celluloid; textile soaps; coated fabrics; artificial leather; used in the manufacture of shatterproof glass and to treat feathers prior to stuffing pillows, etc.	Inhalation; skin absorption	Eyes	Causes blindness through damage to the optic nerve. Symptoms are blurring of vision, pain in the eyes, loss of central vision, and blindness. There are some nervous system symptoms such as dizziness, nausea, and headache.	Pre-employment medical checks for vision and regular comparative checks

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Nickel Carbonyl	Used as a catalyst (intermediate chemical) in plastics and rubber industries	Inhalation; skin absorption	Lungs; skin	Nickel dermatitis may develop. Symptoms of exposure to toxic vapours are of two parts: first, the worker complains of headache at the front of the head, giddiness, tightness in the chest, nausea, and weakness. She has a cough, may be sweating heavily, be short of breath and need to be moved outside to prevent death. After several days, the next set of symptoms may arrive: pain in the chest, dry cough, shortness of breath, blueness of the extremities, fast breathing rate, and weakness. The worker may need artificial respiration and may need to be hospitalised urgently.	Urinary nickel levels if poisoning is suspected
Nitrogen Oxide(s)	Production of fertilisers, dyes, pharmaceuticals, rayon; jewellery making; food production; bleaching; electroplating	Inhalation of gas	Lungs; eyes; skin; teeth	Irritation of the eyes, nose, and throat. Long-term exposure can cause yellowing/brown staining of the teeth and skin. Nitric acid is very corrosive to skin, mouth, nose, and eyes and will kill the tissues, causing severe damage. High doses will cause severe lung irritation while long-term exposure is related to difficulties in breathing.	Skin and eye examinations; checks for lung and heart disease; tests of breathing ability should be regularly performed
Nitrosamines	Rubber industry; leather tanning; used as meat preservative; present in cigarette smoke	Inhalation; skin absorption	Liver; lungs; kidneys	Nausea, vomiting, diarrhoea, stomach pain, jaundice, liver damage, kidney disorders; is a powerful cancer causing agent	No specific medical tests available, but levels must be kept as low as possible. Quit smoking.

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Organophosphates, malathion, parathion,	Pesticide factories; agriculture	Inhalation; skin absorption	Nervous and muscular systems	Shaking hands; vomiting; salivation; diarrhoea; headache; sweating; twitching muscles, sometimes convulsions; if the dosage is sufficiently high, death	<p>Treatment of organophosphate poisoning has to be urgently given. Treatment is based on assumption of poisoning.</p> <p>Atropine is the antidote and should be present in any first aid kit. The other treatment is called 2-PAM 2-pyridine aldoxime methiodide</p>
Ozone	Used as water and food purification agent; also used to bleach textiles and foods such as flour; waxes; oils; paper pulp; starch; sugar. It is used to process perfumes, vanilla, and camphor. Used in deodorising of feathers. Also produced by photocopiers	Inhalation of gas	Lungs; eyes and other wet surfaces of the body such as nose and mouth. Some evidence of birth defects in animal experiments	Irritates the eyes, nose, and throat. Higher concentrations cause coughing, choking and severe fatigue. Middle chest pain and lower lung irritation are also common. If the dose is high enough, water in the lungs may result but usually about eight hours after exposure (i.e., when the worker is at home!) Headache, weakness, shortness of breath with inability to concentrate. Heart and breathing rates slow down and the ability of the blood to carry oxygen is impaired.	<p>Chest X-ray and breathing function tests; Check eyes. Those with chest disease such as asthma should not be employed around ozone.</p> <p>Workers are encouraged not to smoke.</p> <p>Inhalation of high levels of ozone should be followed by medical surveillance</p>

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Phenols and Phenolic Compounds Cresol, phenol, hydroquinone, quinone	These chemicals are widely used in industry as (Cresol) cleaning agents, disinfectants, dyes, plastics, chemical formulation; (hydroquinone) photographic processing, drug making, fur processing, plastics; (phenol) synthetic resins, paper and rubber manufacturing, soap making, (quinone) cosmetic and dye production, photographic film developing, textile	Inhalation of vapour; skin contact.	Skin; mucous membranes; eyes	<p>Many of the phenols are corrosive to skin and are known to cause cancer. Cresol can cause extensive damage with gangrene if not treated immediately. Splashes into the eyes result in damage and possible blindness. Inhalation of cresol can result in dizziness, headache, weakness of muscles, dimness of vision, ringing in the ears, mental confusion, and loss of consciousness.</p> <p>Hydroquinone as a dust irritates the nose and throat. Skin contact with the liquid produces staining of the skin and loss of clearness of vision. Phenol if splashed at high concentrations can damage eyes and cause blindness. If left on the skin, it bleaches the skin and leads to systemic poisoning. Symptoms of this are pallor, weakness, ringing in the ears, shock, turning blue, frothing at the mouth and nose, red-coloured urine and, if not treated, death. Exposure to high concentrations of quinone produce staining of the skin, swelling, irritation, and the rise of pimple-type lumps. Quinone vapour is highly irritating to the eyes.</p>	Workers should wear correct protective clothing. Medical examinations should be done regularly to detect phenol in urine. These shows protective measures are ineffective
Trichloroethylene	Metal cleaning; dry cleaning; laundries; paints; glues; inks; rubber, and soap making; fumigation; drug industry; printers	Inhalation, skin absorption	Nervous system; skin; circulatory system; liver	Dermatitis; mouth and nose irritation; split skin; Over longer periods: liver damage, heart problems, dizziness, feeling very unwell, headache, sweating, slowing of mental abilities, staggering walk	Analysis of exhaled air

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Phosgene	Manufacture of other chemicals such as dyes, drugs, insecticides; used in the manufacture of isocyanates	Inhalation of gas	Lungs, eyes; exposed to liquid, skin is at risk of burns	<p>Watery eyes or red irritated eyes; throat irritation; liquid may cause severe skin burns</p> <p>In high doses, phosgene can cause water in the lungs which takes about five to eight hours to develop (when the worker is at home!) This is signalled by chills, dizziness, thirst, discomfort, increasingly nasty cough, and sputum. It becomes increasingly hard to breathe and the worker turns blue. She may die if urgent attention is not given. Phosgene is dangerous because it gives no other warning signs.</p> <p>Over long periods, the worker will have permanent lung damage, with fibrosis and emphysema.</p>	Chest X-ray and breathing tests. Workers are encouraged not to smoke. If a worker is known to have inhaled phosgene, she should be kept under medical surveillance for 24 hours
Stoddard Solvent	Paint industry; metal cleaning; dry cleaning	Inhalation; skin absorption.	Skin; nervous system	Skin dryness and flakiness (dermatitis); dizziness, nausea and collapse at high exposure levels	
Sulphur dioxide	Production of sulphur-containing chemicals such as fertilisers; food and textiles bleach; tanning; pulp and paper making	Inhalation of gas; direct contact of gas or liquid with skin or the lining of the mouth, nose and throat	Middle respiratory tract	Cough, runny nose, dryness of the throat; high dosages can result to death as the throat closes down, so that the worker cannot breathe. If the worker survives, she may often suffer pneumonia. Long-term exposure leads to fatigue, runny nose, breathlessness when working or walking hard and altered sense of smell.	Chest X-ray, breathing (lung) function tests
Toluene	Perfume making; textile dyes; rubber and cement workers, used as a solvent in making other chemicals. It is used as a cleaning agent and increasingly used instead of benzene.	Inhalation; skin absorption	Nervous system; skin	Irritation of the eyes, skin, and respiratory tract; dermatitis, damage to nervous system signs include headache, drowsiness, fatigue, muscular weakness, incoordination, staggering walk, lack of sensation in the skin. If dose is very high and the condition is untreated, death happens.	<p>May be a cancer-causing agent as it is often contaminated with benzene.</p> <p>Urine tests to detect signs of toluene intoxication</p>

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Trichlorethylene	Dry cleaning industry; food extraction; paints; glues; varnishes; inks. Extracting caffeine from coffee; pesticides; printing; pharmaceuticals; textile; perfume manufacturing	Inhalation; skin absorption	Central and peripheral nervous system; skin; heart; circulatory systems	Exposure to vapour can irritate eyes, nose, and throat. Liquid may damage the eyes if splashed. Long-term exposure can lead to dermatitis. High-level exposure can lead to headache, dizziness, loss of balance, trembling hands, nausea and vomiting, irregular heart beat, sleepiness, blurred vision and “drunkenness.” There are reports of addiction to this chemical—workers sniffing it to get high.	Breath and urine analysis to detect trichloroethylene
Trimellitic anhydride	Photography; polyester making; epoxy resin formulation; paints and plastics	Inhalation of dust or fumes; Skin absorption; ingestion	Lungs; immune system; skin	Water in the lungs; allergy and sensitisation; asthma; and runny nose; irritation of the mucous membranes. There can be delayed respiratory symptoms and distress	Immunological tests
Vinyl Chloride	Plastic piping, floor coverings; upholstery; used by appliances and rubber workers	Inhalation of gas.	Lungs; skin; liver; nervous system	Vinyl chloride is a skin irritant and skin contact may cause frostbite upon evaporation and skin thickening. Eye irritation is also a problem. Nervous system symptoms include light headedness, fatigue, nausea and dulling of hearing and vision. Vinyl chloride is a known cancer-causing agent causing liver cancer. Liver enlargement is one symptom of this. Cancer of the lung, lymphatic and nervous system have also been reported. Vinyl chloride has also been thought to be associated with reproductive problems.	Breath analysis and urine tests

Name	Exposure (Used in What Industries and Processes)	Route of Entry	Body Parts Affected	Symptoms	How Diagnosed: What the Doctor Can Do
Xylene	Glue factories; paint factories; used by synthetic textile makers (rayon polyesters) varnish makers and lacquer makers	Inhalation; some skin absorption	Nervous system; liver and kidneys; skin. Some eye and respiratory involvement	High concentrations may cause dizziness, water in the lungs, and bleeding of the lungs. At very high concentrations, drowsiness, vomiting, nausea, and stomach pains. Dermatitis is also a problem.	Analysis of exhaled air and blood tests
Zinc Chloride	Used by deodorant makers; dental cement laboratories, disinfectant makers, paper makers, rubber workers, textile finishers, dry cell battery makers	Inhalation of dusts or fumes which are freshly generated	Skin; mucous membranes; eyes; lungs	Solid zinc chloride is corrosive to the skin and mucous membranes, while liquids at low concentration may cause burns and dermatitis. Solutions of zinc oxide are also damaging to eyes, and the long-term use of zinc chloride can lead to sensitisation. Few high-concentration exposures have been reported. Metal fume fever with chills.	Urine testing. The symptoms disappear with removal from source with no long-term consequences

Sources: Mc Cunney R. *A Practical Approach to Occupational and Environmental Medicine*. 1994.

U.S. Department Health Education and Welfare NIOSH. *Occupational Diseases: A Guide to their Recognition*. 1977.

Annex 7

Selected Agents that are Toxic for Female Reproduction

Chemical	Industry Exposure	Menstrual Disorder	Comments	Miscarriage	Birth Defects	Effects on Pregnancy	Comments
Metals							
Chromium Compounds	*	*	Infertility				
Copper	*	*					
Lead	*	*		*	*	*	Nerve damage in babies, slowed growth while in womb, premature rupture of waters and premature delivery
Manganese	*	*	60 percent of women ceased ovulating				
Mercury Vapour	*	*		*		*	Premature labour, still births
Radium (radiation) Gases	*	*	Reduced Fertility				
Anaesthetics	*	*	Reduced fertility	*	*	*	Low birth weight, increased nerve, muscle, and bone defects
Other Chemicals							
Acetone	*			*			
Acrylonitrile	*	*				*	Damages placenta
Methylacrylate Alcohols	*	*				*	12 percent abnormal pregnancies

Chemical	Industry Exposure	Menstrual Disorder	Comments	Miscarriage	Birth Defects	Effects on Pregnancy	Comments
Benzene	*	*	reduced female hormone output			*	Some evidence of damage to placenta
Carbon Disulphide	*	*		*		*	Poisons in blood stream
Chlorine	*	*	35 percent suffered frequent periods	*		*	Poisons in blood stream
Chloro-benzene	*	*			*	*	Various defects, poisons in blood
Chloroethane	*	*	Reduced fertility			*	
Chloroprene	*	*					Evidence of placental damage
DNT, TDA	*			*		*	Evidence of placental damage
Ethyl Acetate	*	*					
Ethyl cellosolve	*	*			*		Various defects
Ethylene, ethylene oxide	*	*		*		*	Poisons in the blood
Formaldehyde	*	*		*		*	Poisons in blood, anemia, low birth weight
Gasoline	*	*	Hormonal disturbance resulting in reduced fertility				
Hexachloro-cyclohexane		*	Reduced fertility				
Hydrocarbons (tile industry)	*	*	Ovulation ceases and reduces fertility			*	Delayed reaction of poison in the blood

Chemical	Industry Exposure	Menstrual Disorder	Comments	Miscarriage	Birth Defects	Effects on Pregnancy	Comments
Phenylene-diamine	*	*		*		*	Premature labour
Pthlates	*	*		*		*	Premature labour
Polyamides	*	*					
Polymers	*	*	Ovulation ceases				
Styrene	*	*				*	Poisons in blood
Tetramethyl-thiuram-disulphide	*		Infertility				
Toluene	*	*				*	Poisons in blood
TNT	*	*					
Tacresol	*	*			*		Various defects

Selected Agents that are Toxic for Female and Male Reproduction (from recent research reports)

Agent	Effects
Lead	Direct injury to the testicles, male hormonal disturbance, reduced output, few sperm, toxic changes to the processes that create sperm, decreased sex drive.
Alkyl mercury	Reduced sex drive, reduced sperm output, unable to gain erection. No improvement over time.
Antimonite	Decreased sperm.
Chloroprene	Decreased sperm, increased miscarriages in women.
Vinyl Chloride	Decreased sperm, increased miscarriages in women, increased stillbirths.
Chlordecone (kepone)	Reduced sperm.
Dibromochloropropane DBCP	Decreased testicular size, reduced sperm, hormonal imbalance.
Dinitrotouene	Decreased sperm count and sperm's ability to swim.
Toluenediamine	Increased miscarriages in women.
Nitrous Oxide	Increased miscarriages and stillborn births.
Carbon disulphide	Testicular damage, hormonal imbalance.
Carbolactam and Dinit	Decrease in sperm count and sperm's ability to swim; the two agents together produce increased rates of miscarriages and stillbirths in women.

Annex 8

Some Known Reproductive Hazards

Viral Infections of Concern to Pregnant Workers

Type of Virus	Method of Transmission	Effects	Prevention
HIV (AIDS)	Sexual contact; exposure to infected blood by entry into open wounds, bites or by needle stick injury ¹ in nurses, midwives, traditional birth attendants, ambulance or emergency service and prison staff	Pregnancy may make the disease more acute in already-infected women. The disease will prove fatal to the child born from an infected woman.	The types of care as advised by the Department of Health. Wear gloves, avoid needle stick injuries ¹ , dispose of blood-stained dressings or rags, placentas, etc. by burning. Dispose of needles in special containers. Wear condoms with sexual partners.
Cytomegalovirus (CMV)	Close contact with body fluids of infected person. Those at risk include teachers, nurses, nursing assistants, ambulance, and emergency service personnel. Children in day cares and schools shed CMV in urine. Fifty percent of women are immune, particularly those in nursing.	Baby born with a tiny head, slow and stunted growth, deafness, and nervous system problems Most of the problems have been found in mothers who are exposed to CMV in the first four months of pregnancy.	Take care against infection by wearing gloves, washing hands, and disposing of urine and blood carefully.
Hepatitis B	Contaminated needles; blood exposures; sexual contact Twenty percent of women become contaminated after a needle wound Those at risk: sex workers, nurses, dental assistants and dentists	Babies are born infected with Hepatitis B and become carriers even if they don't show open signs of the illness. About 25 percent go on to develop fatal hardening of the liver or liver cancer.	Hepatitis B vaccines are often available through the Department of Health. The baby can be vaccinated at birth to prevent their carrier status but may still get ill later in life. Take the same precautions as above to avoid infection.
Rubella (German Measles)	Transmitted by an infected person by sneezing or coughing nearby. The virus is also found in urine, faeces, open sores, and in mucous. Those at risk include teachers, nurses, teacher aids, vaccination staff, domestic helpers who care for children	Baby born with film over the eyes, heart problems, and deafness. The earlier in the pregnancy the woman is exposed, the greater number of disabilities to the baby.	Vaccine is effective but needs to be given while the woman is still young and <i>not when already pregnant</i> . Rubella- infected workers should keep away from those who are pregnant and should be encouraged to stay home with pay.

¹ Needle stick is the name given to a wound made when a used hypodermic needle punctures the skin and enters the tissues.

Type of Virus	Method of Transmission	Effects	Prevention
Human Parvovirus B19	<p>Transmission through close contact with infected person and inhaling sneezed or coughed particles; Also through blood or blood products; Mothers may get the disease from their children, teachers, nurses, and domestic helpers at risk.</p> <p>Children get a mild fever with red patterns on the face which make them look like they have been slapped. Red rashes on the body, sometimes getting worse under the sun. Some pain in the joints appears and the disease may linger for three or four weeks.</p>	The illness is usually mild in children and adults. But a baby born to an exposed mother may be born dead or with an accumulation of fluid in the baby's body. Ten percent of babies born are dead.	Prevent infection by washing hands after handling the child or adult and not sharing eating utensils with infected children. Infected people should be given a handkerchief to sneeze or cough into and this should be boiled later.
Chicken Pox	Most adults are immune as they have been exposed when they were children. Transmission occurs through very infectious droplets expelled by sneezing or coughing. Teachers, mothers, nurses, health centre staff, and dental staff are at risk.	If pregnant women get chicken pox or are exposed in the first to three months, around four percent of their babies will be born with the illness. If the baby is exposed to the illness early in life and the mother is non-immune, the baby may get a really bad infection and may die.	Mothers who are worried about immunity should ask for vaccination while pregnant or just before delivery. Avoid infected children and adults.

Various Organic Solvents Known to Affect Reproduction

Chemical Classification	Examples	Reproductive Effects
Aromatic Hydrocarbons	benzene, toluene, xylene	Long-term inhalation of toluene leads to facial and limb malformations, nervous system problems, and the baby is slow to grow inside the womb. All chemicals in this group can cause menstrual disorders.
Halogenated Hydrocarbons	chlorodifluoromethane monochloromonofluoromethane carbon tetrachloride methylene chloride perchloroethylene	No data No data No data Can reduce the baby's access to oxygen. Associated with infant jaundice from contaminated breast milk
Aldehydes	formaldehyde	Menstrual disorders
Glycol Ethers	ethylene glycol monomethyl ether (EGME) ethylene glycol monethyl ether (EGEE) Propylene Glycol Ether	Decreased sperm count and affects female fertility PGE can be used a safe substitute for EGME and EEGE
Ketones	Methyl Ethyl Ketone, Acetone	No clear data on either chemical except when combined with others

Pesticides Known to Cause Reproductive Effects

Chemical Classification	Examples	Reproductive Effects
Fumigants: usually used to kill more than one pest and are often used in the form of vapour or mist.	Dibromochloropropane(DBCP) <i>Banned in the USA and Australia</i> Carbon Disulphide Ehylene Dibromide	Reduced sperm count and infertility, poor chance of recovery. Menstrual irregularities, lowered sex drive, sperm abnormalities. Decreased sperm count and reduced sperm motility (sperm's ability to swim), increased number of strange-looking sperms, reduced fertility in males.
Herbicides: chemicals used to kill plants (weeds).	TCDD (Dioxin) found in Agent Orange 2,4,5 trichlorophenoxyacetic acid (245T); used in Agent Orange 2,4 dichlorophenoxyacetic acid (24D); also used in Agent Orange	Spontaneous abortions, increased spina bifida ² and growths full of blood vessels . Increased miscarriage rates and cleft palates in babies. No clear data.
Fungicides: used to kill fungus on plants and tree crops	Beromyl	No data
Organochlorines	DDT Chlordane and Heptachlor Chlordecone (Kepone) Lindane - used as body shampoo for lice and scabies	Examination of miscarried and premature babies indicates high levels in body tissues. Concentrates in breast milk Childhood tumors and blood disorders. Decreased sperm count and reduced motility in sperm. Affects the nervous system of the baby in the womb and should not be used by pregnant women.
Organophosphates: these inhibit the nervous activity of pests	Dichlorvos Chlorpyrifos	No Data No Data
Miscellaneous	Deet: used to treat mosquito nets and used in insect repellents. Pyrethrum: from the chrysanthemum flower and used in mosquito coils	No Data No Data

² Spina bifida is a birth defect in which the bony covering and layers of fibrous tissue which protect the spinal nerves and spinal cord are missing in varying degrees. In severe cases, children are unable to walk.

Annex 9

Fire Safety Checklist

There is nothing as frightening as a factory fire. We all dread the thought that one day we could be trapped in a fire and not be able to escape. In the past few years, the press has reported appalling stories about young women locked inside toy factories in Thailand and China whose lives were cut short by the wild flames that consumed them while they fought to find a way out.

Many risk factors contribute to fire. Careless smokers tossing away their butts are one of the major culprits, as are poorly wired factories where electrical circuits overload. The heat generated by the overloaded circuits sets fire to materials nearby. Use of flammable paints, explosive gases, solvents and other chemicals is also a major contributor to factory fire.

Fire safety is fundamental to workplace health and safety. To assist you in your analysis of workplace factors and risks, you will find below a detailed checklist for fire safety. Some of the terms may be unfamiliar to you, particularly those related to electrical circuitry. If possible, liaise with the trade union that represents electrical workers so they can assist you.

But first, some background on fires and how to avoid them.

Each year, fires cost industry vast amounts of money. Careless or untrained personnel misuse materials, contractors misunderstand the risk of fire in the premises they visit, or intruders set fires to cover their tracks. Some fires are started for insurance or revenge purposes. They all cause damage, loss of work and damage, if not, loss of human life.

The fire itself may not kill or injure but the fumes that arise from burning plastics, paints and other substances can cause illness in the community, and death. Thus, it is important for all of us to know how to prevent and combat fires at work.

How Materials Contribute to Fires

Materials used at work usually fall into several categories when it comes to fire:

1. Those that are easily set alight

Examples: wood shavings, paper fibres, foam rubber or plastics, some liquids, aerosol oils, some gases

2. Those capable of spreading fire

Examples: Substances which burn fiercely may spread fire by radiated heat, such as rubber or many melt and flow—wax and asphalt. Explosive objects such as partially filled drums or gas cylinders may also shatter, sending burning fragments in all directions.

There are substances which produce intense smoke such as cork, polyurethane, or polystyrene foam which also spread fire indirectly by hindering fire fighting efforts.

3. **Dangerous reactive substances**

Some chemicals like sodium react violently when mixed with water. Acids and alkalis also react together.

4. **Oxidising agents**

Substances which break down and produce oxygen are dangerous as fire needs oxygen to continue burning. When these products break down or react to heat, they produce lots of oxygen making the fire burn more intensely—it's like tossing petrol on a fire.

Examples of chemicals that might react like that are: nitric acid, inorganic nitrates, permanganates (potassium or sodium) chlorates, chromates, dichromates, inorganic peroxides, and organic peroxides.

5. **Spontaneous combustion**

Sometimes the action of germs or fungus living inside heaps of dusts or fibres can raise the temperature inside the pile sufficiently high to start a fire.

Storage Hazards

The investigation of many factory fires indicates that many start inside the storage areas. They are usually due to:

- careless disposal of cigarettes
- putting materials too close to heating elements or machinery associated with exhausts or other
- machines being used in the storage bay
- processes involving naked flames, e.g., shrink wrapping and sealing

Other causes are:

- cutting and welding without the necessary precautions
- excessive amounts of inflammable liquids being stored or kept inside
- poor maintenance
- accumulation of industrial waste in and around the plant

Reducing the Hazard

1. Large quantities of high value combustible products should be protected by fire protection systems such as automatic sprinkler systems or be confined to fire retardant (slowing or resistant) compartments.
2. Bulk quantities of flammable liquids should be kept in proper flammable storage and separated from the main building. Only small amounts for use should be issued each day. If they are used continuously, an underground piped in system should be considered.
3. Products that burn fiercely or melt and flow should be stored at a distance from the major buildings.
4. If some of the substances used flow into drains or rivers, they might also catch fire. This is a particular problem in the Majority World where environmental restrictions are often lax. Oil floating on the water can cause enormous damage to housing areas if it catches fire.

5. Dangerously reactive materials should be kept in a special cupboard free from moisture (note this in hot humid countries—you may have to add silica to attract moisture from the air).

Oxidising Agents

Substances which fall in this category should be stored in clean, dry areas separate from anything that contains carbon. Oil coming into contact with oxidising agents can cause violent reactions and when decanting oxidising agents, clean, dry spoons and ladles should be used.

Spontaneous Combustion:

Materials such as rice husks, wood dusts, or piles of fertilizer which are likely to spontaneously burst into flame should be kept away from the major premises and from sources of additional heat such as steam carrying pipes.

Prevention of Storage Hazards

- Storage areas should be separated from the production floor to contain any fire that breaks out.
- Automatic fire protection should be provided.
- Smoking should not be allowed in storage areas (or on the production floor) if flammable chemicals and other materials are used. Disallow any naked flames in storage areas.

Miscellaneous Prevention

Waste should be removed from the building at least daily and should not be allowed to build up near exits. If waste is burned on site, the incinerator should be covered or have spark arresters to prevent them from blowing back the wind to the factory.

Regular maintenance checks of electrical circuitry and machinery are important to prevent fires.

Fire Safety Checklist

Fire Services

- | | YES | NO |
|--|-----|----|
| 1 Do you know the location and contact number of the nearest fire station in the premises? | | |
| 2 Are the telephone numbers prominently displayed? | | |
| 3 Do you know how long it would take for a fire truck or wagon to arrive at your workplace? | | |
| 4 Can you identify the hazardous areas in the premises? | | |
| 5 Could you describe the risk to the fire services? | | |
| 6 Has the fire service ever visited your factory? | | |
| 7 Is the car park right in front of the major fire fighting apparatus such as a hydrant? | | |
| 8 Do you know if management regularly meets with the fire service to plan fire evacuation and prevention strategies? | | |

Fire Defence

- | | YES | NO |
|---|-----|----|
| 1 Do you have a shop floor fire committee or fire warden? | | |
| 2 Do you know the responsible person(s)? | | |
| 3 Does the enterprise have a fire safety policy? | | |
| 4 Are everyone's responsibilities and duties in case of fire adequately and clearly stated on a program? | | |
| 5 Are employees instructed on safe working practice? | | |
| 6 Is there a preventive maintenance program in place to ensure machine and electrical safety? | | |
| 7 Is there a fire alarm with a distinctive signal? | | |
| 8 Does the enterprise organise regular safety inspections? | | |
| 9 Do you have an evacuation procedure? | | |
| 10 Do you receive regular fire safety and evacuation training or training on the use of fire extinguishers? | | |
| 11 Do security personnel know what to do in case of fire? | | |
| 12 Are all fire exits marked and left unlocked while workers are in the premises? | | |

Fire Hazard Materials

- | | YES | NO |
|---|-----|----|
| 1 Do you use materials that readily burst into flame? | | |
| 2 Does the enterprise use a lot of materials like rubber that burns ferociously and gives off lots of heat? | | |
| 3 Does the enterprise use materials that melt and flow? | | |
| 4 Does the enterprise store or use explosive materials? | | |
| 5 Does it use substances that would give off dense/toxic smoke in the event of fire? | | |
| 6 Do you use or store any material which might absorb water and destroy buildings through expansion? | | |
| 7 Does the factory use or store materials that are highly reactive like sodium? | | |
| 8 Does the enterprise use oxidising materials? | | |
| 9 Can any action be immediately taken to improve fire safety and risk of combustion or spread? | | |

Other Fire Hazards

- | | YES | NO |
|---|------------|-----------|
| 1 Are the premises kept clear of waste? | | |
| 2 Is waste swept up daily and removed? | | |
| 3 Are metal bins with lids used for flammable waste? | | |
| 4 Are waste collection areas at a distance from the main buildings? | | |
| 5 Is smoking prohibited inside the production area or wherever flammable products are used? | | |

Other Fire Hazards

- | | YES | NO |
|---|------------|-----------|
| 1 Are the premises kept clear of waste? | | |
| 2 Is waste swept up daily and removed? | | |
| 3 Are metal bins with lids used for flammable waste? | | |
| 4 Are waste collection areas at a distance from the main building? | | |
| 5 Is smoking prohibited inside the production area or wherever flammable products are used? | | |
| 6 Are non-smoking areas clearly defined? | | |
| 7 Are there specified areas in which to put cigarette butts? | | |
| 8 Are there any naked flames in areas where flammable materials are used? | | |

Sprinklers and Other Installations

- | | YES | NO |
|--|------------|-----------|
| 1 Are the premises fitted with sprinkler systems? | | |
| 2 Are they regularly checked to see if the valves are all correctly fitted and the sensors are still responsive? | | |
| 3 Are there any other fire safety precautions in place, such as smoke detectors or alarms? | | |
| 4 Is there a hose reel with hose? | YES | NO |
| 5 Is the hose in good condition? How often is it unraveled and checked? | | |
| 6 Is there enough water in the hose reel system to combat a fire? | | |

Portable Fire Extinguishers

- | | YES | NO |
|---|------------|-----------|
| 1 Are the Portable Fire Extinguishers (PFE) all of the approved type? | | |
| 2 Are they suitable for the types of fire you might have in your workplace? (see below) | | |
| 3 At a minimum, if there are no extinguishers, are there buckets of sand distributed throughout the premises? | | |
| 4 Can the PFE be clearly seen from all over the premises? | | |
| 5 Would a person have to go more than 23 meters to grab the nearest PFE or hose reel? | | |
| 6 Are there PFE located on the escape routes of the factory? | | |
| 7 Are they checked each year by a competent person? | | |
| 8 Have employees been taught to use them? | | |
| 9 Can they be handled by the women? | | |

Electrical Fire Hazards

- | | YES | NO |
|---|------------|-----------|
| 1 Are the electrical circuits and plugs checked regularly by a qualified electrician? | | |
| 2 Do you have any temporary extension wiring which has been in place for over six months? | | |
| 3 Are electrical cables and fittings located near water or behind stacked materials which may build up heat? | | |
| 4 Are all electrical fittings earthed? | | |
| 5 Is the earthing regularly checked? | | |
| 6 Are precautions taken to prevent the build up of static electricity? (particularly important in factories making plastic) | | |
| 7 Are people in areas with static electricity given rubber-soled foot wear and gloves? | | |

Structural Fire Hazards

- | | YES | NO |
|--|------------|-----------|
| 1 Does the structure of the enterprise provide potential fuel for fires (e.g., lots of dry wood, exposed straw insulation, etc.)? | | |
| 2 Is the ceiling constructed of plywood paneling which could easily spread the fire? | | |
| 3 Are all fire doors in working order? | | |
| 4 When you go out of the fire door, do you encounter any obstructions, drops, locked gates, enclosed rooms, crowded car parks or the like? | | |

Flammable Liquids and Gases

- | | YES | NO |
|---|------------|-----------|
| 1 Do you have a list of all the flammable liquids and gases used in the plant? | | |
| 2 Are they all kept in appropriate storage areas separate from the production area? | | |
| 3 Are large amounts stored well away from the major buildings? | | |
| 4 Are these storage areas surrounded by raised bunds? | | |
| 5 In the case of highly flammable or explosive solvents, has some thought been given to the substitution of less hazardous chemicals? | | |
| 6 Are all those working with dangerous materials trained in safe handling? | | |
| 7 Are there adequate means of escape for workers handling chemicals? | | |
| 8 Is there a risk of fume build up in the chemical handling and/or storage areas? | | |
| 9 Are the PFE suitable for the types of fire you may encounter in this area? | | |

Dust Hazards

- | | YES | NO |
|---|------------|-----------|
| 1 Do the processes and tasks of work create significant dust hazards? | | |
| 2 Are you satisfied with the precautions taken to limit dust? | | |
| 3 Are cleaning operations frequent and thorough enough to remove dust from overhead beams, sills, etc.? | | |
| 4 Have sufficient precautions been taken to eliminate all possible sources of dust ignition such as electrical sparks, static electricity, and smoking? | | |

- 5 Has the company taken any action to lessen the risk of dust explosion?

Being Ready To Fight Fires

Women need to learn how to prevent and fight fires as they are most frequently the victims of lack of knowledge and poor commitment to fire safety.

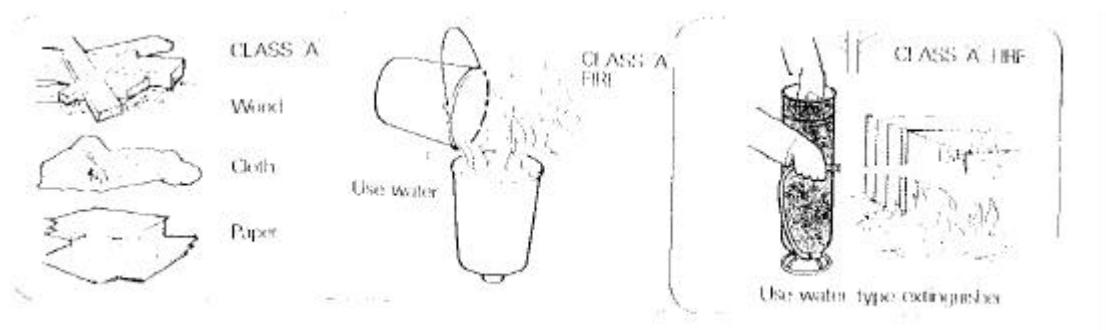
- Companies should have regular fire safety training (at least six trainings every month if the workforce is larger than 1,000 and if labour turnover is high).
- Women should know the fire practices and responsibilities associated with fire safety. If you are a warden, make sure the other women know.
- Make sure you know how to use the equipment and know where all fire exits are.
- Know all the escape routes and communicate these to the other women.
- Keep all exits, stairs, ladders, and other means of escape clear.
- Learn the location of all fire alarms.
- Keep extinguishers away from extremes of hot and cold.
- If an extinguisher is used (say, for practice or even for a real fire), make sure it is refilled and not merely put back into its bracket.
- Make sure they are all maintained and checked regularly. The metal tag on the side should tell you when it was last checked. Every three months is the minimum period between checks.

Types of Fires

Women need to know about the way in which fires are classified so that they know which extinguisher to use.

Class A Fires

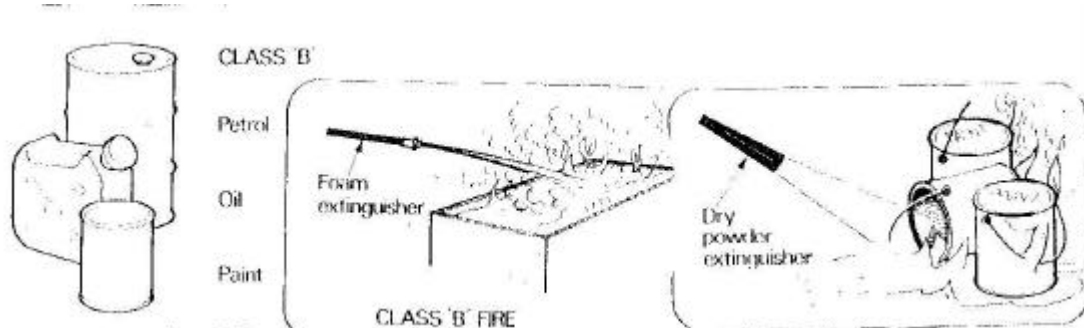
These are when things like wood, paper, fabric and packing materials catch fire. They are the fires you have at home to dispose of rubbish and to cook food. In essence, a barbecue is a Class A fire! Class A fires are best put out by using water as water cools and penetrates down to the layers below, thus, preventing more fire.



Water-type extinguishers are also good for Class A fires. Foam extinguishers can also be used but they are not as effective as water and are more expensive!

Class B Fires

These happen when flammable liquids, such as oil, petrol, wax, lacquers, paints, grease, thinners and solvents catch fire. Kitchen fires when the pan of oil left heating in the kitchen catches fire and blazes away. This is a Class B fire!



The best way to fight these fires is by smothering the fire with a blanket to cut off the oxygen supply. A wool blanket is best as wool is slow to burn; but thick cotton will work. *Do not throw water on the fire as the result is usually a burst of flaming blobs that may set fire to other things including you. If you are wearing synthetic clothes made of fibres like nylon, then the fabric might melt onto your skin.*

Dry powder and carbon dioxide (CO₂) extinguishers can be used in an industrial setting.

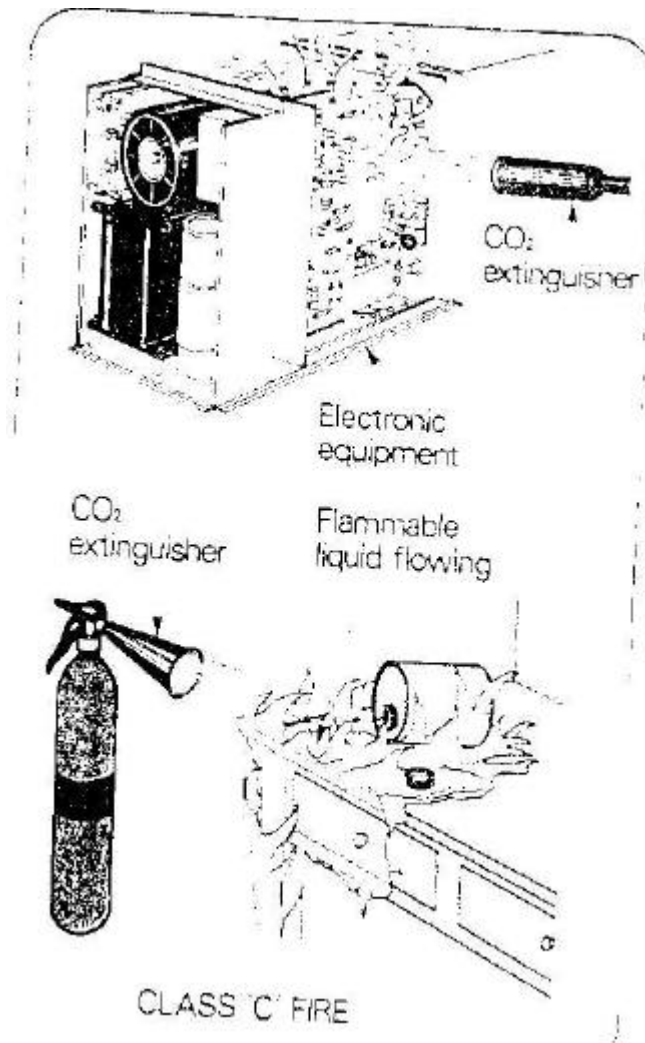
Foam extinguishers can be used where the liquids are on fire in a tank or other container and there is a risk that the substance is so hot that it might catch fire again when exposed to air.

Class C Fires

Involve electricity such as switchboards, machinery, cables and other electronic equipment. Again, these types of fire happen at home when wires are old, poorly-maintained or are overloaded.

Blanketing or smothering is best to kill this type of fire. Vapourising liquid (BCF) extinguishers can also be used if available as can CO₂ or dry powder chemical extinguishers.

NEVER USE WATER ON A CLASS C ELECTRICAL FIRE AS THE ELECTRICAL CURRENT CAN FLOW BACK ALONG THE WATER STREAM, AND DEPENDING ON HOW STRONG IT IS, IT CAN SHOCK OR KILL THE PERSON SPRAYING THE FIRE.



Get Friendly With Your Extinguishers: Learn to Tell them Apart

Wander around your place of work and look at the extinguishers hanging on the wall. Note what they look like, the colour of the canister, the types of fitting and their locations.

There are five basic types with several varieties in each type.

Above or beside each extinguisher should be a metal plate, which tells you how to operate it and what types of fire it is suitable for.

If the plate is not obvious, you need to remind the supervisor that the system is better if the plates are in place.

Water-Filled Extinguishers

The three types of water-filled extinguishers are *only used for Class A fires*.

They are normally painted RED and have a range of about 10 meters. That is, if you open one, the stream will project about ten meters.

Open according to directions.

The **Soda Acid** type is simple to operate if held in the right way. Direct the stream at the seat of the fire from the closest comfortable and safest position.

This type usually keeps operating until it is empty.

Gas Pressure operates like the Soda Acid type and also empties on operation.

The **Stored Air Pressure** variety is usually trigger-operated and can be stopped at any time.

Carbon Dioxide (CO₂) Extinguishers

These beauties are filled with CO₂ turned into liquid by being put under pressure (and we all know what that feels like).

They are great for fighting *Class A and C fires*.

They have to have a plastic horn or extended thick nozzle (like a hair dryer) for safe operation as the liquid CO₂ turns back into a gas when it escapes, making the air and nozzle very cold indeed.

The small ones have a limited range while the larger ones can fight fires up to three meters away.

Make sure you read the operating instructions.

CO₂ extinguishers are particularly good in situations where you do not want to damage delicate equipment such as in a laboratory, or if you don't want to cause additional damage. They are also good for fighting fires in accessible places as they surround the fire with gas so you don't need to direct a stream to the fire.

They are also ideal for flowing flammable liquids that are on fire, such as paints or oils.

Use as close to the fire as possible aiming as close as possible to the rear of the fire, then moving the nozzle left and right, move gradually forward until the fire is dead.

WELL-VENTILATED (AND TINY PLACES ARE NOT USUALLY LIKE THAT).

Foam Extinguishers

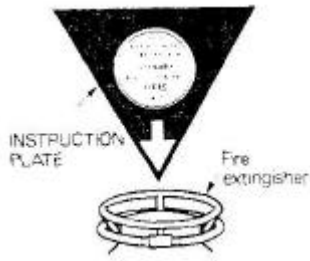
The chemical and mechanical varieties of extinguishers are suitable for use on *Class B fires and limited Class A fires* (see above).

They are painted BLUE and have a range of about six meters, coating the scene with a blanket of foam that smothers the fire. The foam is surprisingly like shaving froth.

These are less effective on flowing liquid fires or on other liquid fires such as alcohol.

To stop fire that is consuming liquid in a tank, aim the jet at the side of the tank above the liquid. This causes the foam to flow down and float on the surface of the burning liquid.

Different Kinds of Fire Extinguishers



Instruction Plate



Vapourising Liquid Extinguishers - Class B and C Fires



Stored Air Pressure - Class A Fires Only



Gas Pressure - Class A Fires Only



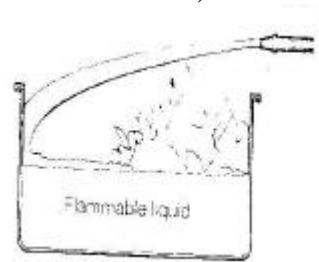
Foam Extinguishers - Class B (and some Class A Fires)



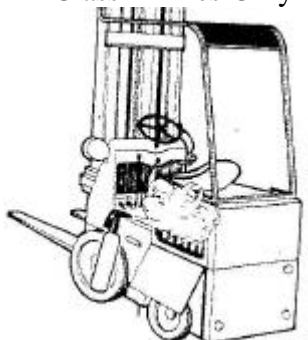
Soda Acid - water variety - Class A Fires Only



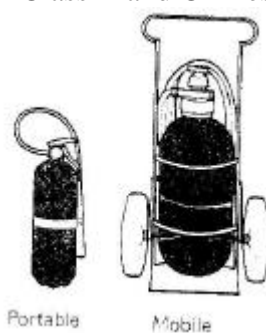
CO₂ Extinguisher - Class B and C Fires



Aim Foam Jet at Back Side of Tank



Vapourising Liquid Extinguisher for Fires in Motor Vehicles



Dry Powder Extinguisher - Portable and Mobile



Dry Powder Extinguisher - Spilled burning liquid

Dry Powder Extinguishers

These “fire bombs” are filled with dry powder chemicals which are thrown out by gas or stored air pressure in the tank. Like being shot out of a cannon!

They are suitable for *Class B and C fires*.

They are usually painted RED with a WHITE BAND and have fan shaped nozzles.

The small ones have a range of about three meters, and the large ones up to six meters. Read the instructions to find out how to operate them.

Dry powder extinguishers tend to smother the fire and the chemical fog protects the operator from heat.

This type is the best to use for liquid fires where the liquid has been spilled in large amounts (rubber, oils, plastics, etc).

You can buy small “pistol” type extinguishers which are good against any type of fire, in hard to get at places. These should not be wasted on big or smoldering fires but can be kept close at hand in cars, home or workplaces.

Annex 10

Sample of A Hazard Reporting Form

To be Submitted to the Chief Executive Officer

Name: *Asmin S* **Section:** *Packing* **Contact:** *Mss Hanh (supervisor) ext 345*

Date and Time of Day Hazard Noted: *Thursday, 21 May at lunchtime*

Nature of Hazard and Location: *I was on my way to the lunchroom and tripped on a loose floor tile just outside the women's toilets. There is broken glass in the window of the toilet and if someone fell into that window it could cause a bad injury. The loose tile is in the walkway between the packing section and the lunch room and right next to the women's toilet.*

Recommended Action: *I think the tile and the glass both need to be replaced. Because the window is in an area where there is a lot of activity (many workers and forklifts go past), it should be replaced with glass that has wire in it because that might be stronger.*

The tiled floors in the other parts of the factory have metal edge strips holding the tiles down which could prevent the tiles lifting again in the future. I think it would be good to have edge strips in this part too.

Signed:

Date: *24 May*

Supervisor's Comments:

I have looked at the problem raised by Asmin and agree with her assessment. Several women have tripped on the same tile. One girl sprained her ankle. The area is also a bit dark. I suggest we increase the lighting in the area by using a 1000 watt light bulb instead of the 45 watt ones currently used.

Signed:

Date: *19 June*

Safety Officer's Report:

I have visited the site and have contacted the works maintenance supervisor. He has agree to get the work done next week. The accountant has approved the expenditure necessary for the repairs.

When I discussed this with the women workers in the area, it appears that at least four women have had minor accidents from the tile. One sprained her ankle badly and had three days off work. The costs of repair would be offset by the costs of time off work.

Signed:

Date: *12 July*

CEO's Comments:

I have noted the time taken between the report was made and the time taken for the safety officer to take action and I am not satisfied that the situation was acted on as efficiently as it could be. I have referred it back to the safety officer to report to me and the causes of the delay. I approve the action taken so far.

Signed:

Date: *20 July*

Annex 11

Standard Questionnaire on Respiratory (Breathing) Symptoms

This type of form may be used by a doctor to examine women exposed to substances that may damage their lungs. If a woman has symptoms of lung disease, the following questions will help a doctor discover how seriously she is affected. The doctor should ask all of these questions to gain adequate diagnostic information. If the doctor does not ask these questions, you can volunteer your own information based on your knowledge of this form.

Workplace..... Type of Work.....

Name Age Height..... Weight.....

Answer the following questions with a yes or no, if possible.

Cough

1. Do you usually cough when you wake first thing in the morning?
2. Do you cough during the day?
3. Do you usually cough at night?
4. Do you cough like this for at least three months of the year?
5. Is the cough worse on any particular day of the week?

If yes, which days? (This is particularly important in cases of byssinosis which comes from exposure to cotton and other fabric dusts.)

Phlegm

1. Do you bring up phlegm first thing in the morning?
2. Do you bring up phlegm during the day or at night?
3. Do you bring up phlegm like this for more than three months of the year?
4. How long have you had this phlegm?
5. In the past three years, have you noticed an increase in the number of periods when the cough and phlegm lasts for three weeks or more?
6. Have you experienced more than one period like this?

Tightness in the Chest

1. Does your chest ever feels tight?
2. Do you have difficulty breathing?
3. Do you suffer this even when you don't have a cold or flu?
4. Does you chest feel tight on any specific days?
 - a. Most of the first days back at work only
 - b. Other days also
 - c. Only on other days

Breathlessness

1. Are you troubled by breathlessness when walking fast or walking up a slight hill?
2. Do you feel breathless when walking with other friends your own age on level ground?
3. Do you have to stop for breath when you are walking at your own pace on level ground?
4. Is your breathlessness worse on any particular day? (Specify)

Chest Illness

1. Over the past three years, have you suffered any chest illness that has kept you away from work for more than one week?
2. Did you bring up more phlegm than usual when you had this illness?
3. Have you had more than one such illness in the past three years?

Past Illness

Have you ever had:

- | | | |
|--------------------------------|---------------------------------|---------------|
| 1. An operation on your chest? | 5. Pleurisy? | 9. Hay fever? |
| 2. Heart trouble? | 6. Pulmonary Tuberculosis (TB)? | |
| 3. Bronchitis? | 7. Asthma? | |
| 4. Pneumonia? | 8. Other Chest Trouble | |

Tobacco Smoking

1. Do you smoke?

If yes, how many per day? What type of smoking do you prefer (cigarettes, hand-rolled cigarettes, pipe, cigars)?

2. Have you ever smoked? When did you give up?

Occupation

Do you or did you work in any of the following industries and for how long?

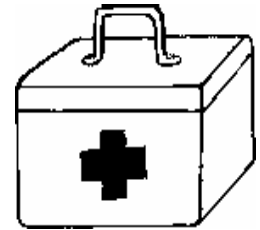
1. Dusty job (describe)
2. Coal mine
3. Other type of mine
4. Quarry
5. Foundry
6. Pottery (ceramics)
7. Textile: cotton, flax or hemp mill?
8. Asbestos
9. In any other dusty jobs?
10. Have you ever been regularly exposed to irritating gas or chemical fumes? Do you know what the name of the gas or chemical is?
11. For how long were you exposed to this gas or chemical? Explain what you did and how the exposure occurred.

Annex 12

First Aid for First Aid Kits

How many times have you gone to the first aid cupboard or box at home or at work and found it empty of the thing you want? How many times have you found lots of useless things that you would never use, looking limp and yellow inside?

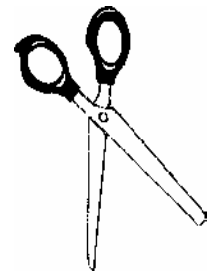
The items listed below are the recommended items that you keep in a practical first aid kit. While commercial ones are available, you can make your own. Plastic boxes (they look like toolboxes) are cheap and easily available. Mark them with the Red Cross that is the international symbol for first aid and medical care, and stuff it with what lies below. You should have one at home as well as at work.



First Aid Box

I found this list in a journal called *Every Second Counts* (Summer 1999). I am grateful to Ellie Grossman who compiled the list.

1. Tweezers are great to remove splinters, needles of metal or glass, and maybe even ticks from a wound. The pointed-end ones are best. The object should be grasped as close to the skin as possible to reduce the possibility of it breaking off.



Scissors with blunt nose

2. A Large Safety Pin is one of the most useful first aid tools as it can be used to dig out things embedded in the skin, to secure a bandage, or pop a blister as well as keep your trousers from falling down! If you use it to dig around in the skin or to pop a blister make sure you sterilise the pointy end by running it through a flame.

3. Mouth To Barrier Devices which are used to give resuscitation when someone has stopped breathing. These enable you to give the “breath of life” that is resuscitation (breathing into their body to restart the breathing process) without risk to your health. Normally, one would place one's mouth over the nose and mouth of an injured or collapsed person. However, with the rise in the number of HIV/AIDS and hepatitis cases, if the person is bleeding after an accident, a valved mask like this is very useful.



Bandaged foot

4. Disposable Gloves protect you from blood-borne diseases and the collapsed person from dirt or germs that might be on your hands if you have no time or facilities to wash.

5. Ice Packs to put on strains, sprains and bruised areas. First apply for 20-30 minutes after the injury. Wrap the pack in a light towel first. If hard to find frozen peas, other chopped or small vegetables are a good substitute. Note: Of course ice packs are only possible if you have a refrigerator at work or at home. Cold also reduces a lot of bleeding in severe cuts but beware if the person is shocked at which point adding cold may be dangerous.

- 6. Gauze Pads** measuring 12cms x 12cms (or 4x4 in) are good for placing on open wounds. Best if they are sterile and have not been opened. To stop heavy bleeding, put hand pressure on the wound. If possible, buy dressings with a non-stop surface so that when you take the dressing off the bleeding does not start again. Dressings that are painfully stuck to wounds can be soaked off by placing the wound in a thick solution of water and either Lux Flakes or shaved pure soap.
- 7. Strip Dressings (*Band Aids*)** in a variety of sizes and shapes are useful for instant wound care. Otherwise, gauze strip cut into a suitable size and adhesive tape can be used.
- 8. Lightly Elastic Bandage** holds compression dressings or splints in place and can be used to support a sprained joint.
- 9. Scissors** with a blunt nose so that they don't pierce the patients skin as you use them.
- 10. Heavier Strength Elastic Bandage** for sprained ankles, knees and open leg wounds to compress and reduce blood loss. For ankles, use a rolled sock around the anklebones to stop the bone from being rubbed, then roll the bandage over it around and under the foot like a figure eight.
- 11. Adhesive Tape** (surgical or elastic tape – like Elastoplast) 4 cms (1.5 inches) wide. This is good for wrapping emergency splints in the event of a broken bone. It can be wrapped around the limb (not up and down) and can be pulled off with minimal pain if you pull it off in the same direction as the hair lies.
- 12. Duct Tape** (also known as *Gaffa* tape) prevents blisters, good for wrapping splints and for making emergency slings as it is strong and wide. To prevent blisters, cut some thick fabric (or foam rubber) to a size larger than the red spot. Make a hole in the foam or fabric, the same size as the impending blister and stick in with duct tape.
- 13. Antibiotic Cream** Bacteroban is best and will prevent infection of burns and other wounds.
- 14. Calamine Lotion** is old fashioned but still effective for itchy skin and allergic reactions, bee stings and soothing for rashes.
- 15. Hydrocortisone Cream** (1 percent solution) to reduce minor inflammations and skin irritation and itching if calamine doesn't help.
- 16. Aspirin** reduces swelling, pain, and fever. But it should not be given to children under two years of age. Always take with lots of water to reduce risk of tummy trouble.
- 17. Antihistamine cream** such as Phenergan reduces pain and swelling due to allergy or bites.
- 18. An emergency blanket** to reduce the effects of shock.

Annex 13

Taming Machines - Machine Safety

Most modern and many old workplaces use machines for their production activities. Women, being increasingly employed in the industrial sector, have to work with machines. The new ones tend to have safeguards built in, but many of the old ones don't have.

When I first started working on OHS machine-guarding was the domain of male engineers, guys with grey beards who sat at drawing boards designing the grids that would keep workers from being injured by a wheel or gear. Then, it was largely men who worked with machines – fitters, machinists and boilermakers.

Now it is different. Women use all sorts of machines and in some countries with equal opportunity, are taking over men's job: they are the machinists and the fitters. Many of the machines they use are hazardous with rapidly spinning and moving parts. Others like presses operate with such force that fingers and even hands disappear into their mouths before women can cry out in agony. Drills and rapidly rotating wheels can trap a woman's beautiful flowing hair or clothing, wrenching her in and tearing the hair from her head.

Machines have speeded up work. To maximise the use of machines and tempt workers to go faster, bosses have instituted target rates. To achieve those targets, workers sometimes see machine guards as obstructing their ability to achieve the target and make money. This is a risky thing to do. Fingers do not grow back unless a very good micro-surgeon is at hand to sew them back on. Unsightly wounds will scar and maim for life.

There are a few simple principles that need to be kept in mind. But first, a bit of background.

The dangerous parts of machines are usually at:

- at the point of operation, that is where the drill or punch comes down
- where the power (electricity usually) is linked to the machine
- around the moving parts

Let's look first at the working end of the machine, the bit that women are most familiar with.

Have a walk around the plant and see where the various machines are situated and what they do. Are some problematic? That is, does the operator have trouble loading or extracting the finished piece? Is she or he under pressure because of that? These are the very people who may remove guards or get impatient and may have accidents.

Do any of the operators approach their machines with fear? Have there already been accidents? Are there already machines which have broken or defective guards? Look at some of the drawings in this book to see what is meant by the term *guards*.

If a guard has been removed it, often means that the guard is not well designed.

Remember, bosses want to maximise productivity so you can argue that well designed guards will increase productivity, safety and welfare. The women workers, knowing that management cares, might be more motivated to work well.

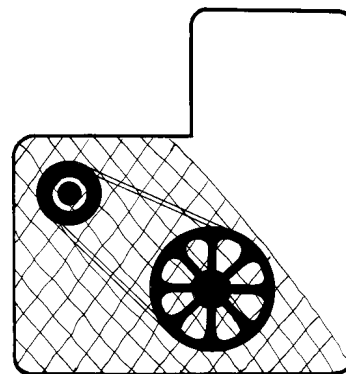
Obviously, the best thing is to convince management that a machine that has claimed a lot of casualties is just plain dangerous and should be replaced. This is the first principle to remember, replace or engineer out a hazard before deciding to isolate it...

But if they don't agree you will have to look at guarding the machine. Some examples are to be found elsewhere in this book. At any rate, the manager should be asked to consider buying safe machines when he or she has to upgrade.

Types Of Machine Guards

Fixed Guards

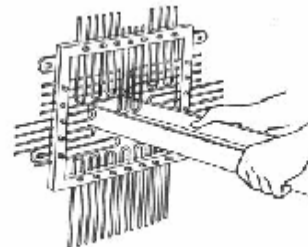
An example of this is a grill that covers rotating wheels or gears on the side of a machine. They are the simplest of the guards and are usually permanently fixed to the machine and do not get in the way of production. They should be made of strong materials such as metal mesh to stop metal parts from flying in case of malfunction. They should only be opened by special tools of the maintenance teams.



Fixed Guards

Adjustable Guards

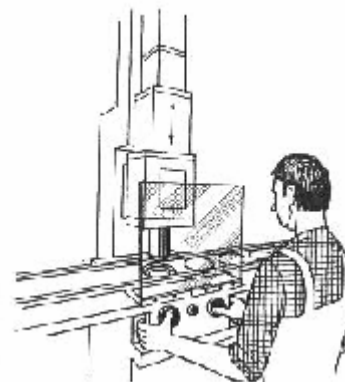
These can be adjusted to fit any change in the size of the stock (the working materials) while still providing protection. Some adjustable guards have springs so they can fit around the stock



Adjustable Guard

Two Handed Controls

Shoe factories use power presses to punch out shoe soles. These presses are strong enough to cut off a person's hand. It used to happen when workers would, bored by the job or slightly out in their timing, operate the press when their hand was still underneath creating, horrible results. Since then, presses have been designed with two-hand controls. That is, both left and right buttons have to be pushed to make the press go down. In this case both hands are therefore well out of the way when the press operates, thus, reducing

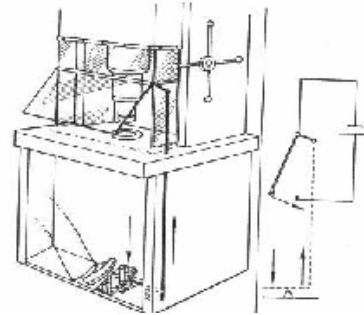


A machine with two-hand controls

risk. However sometimes workers tape the buttons down or operate them with their knees so they can work faster. It is up to you and supervisors to educate workers that this is playing with their fate.

Interlock Guards

These are a more complex type of guard, and rely on mechanical or electrical means to stop an operation until certain things happen. For instance, some interlock guards stop the operation until a button at a remote location is pushed, thus, ensuring all people are out of the way when it occurs.



Pedal activation of an interlock guard

Choosing the Right Guard

The major things to think of are:

- Safety
- Efficiency
- Productivity
- Cost

Bosses are more likely to be sympathetic if you can show that a guard will not reduce efficiency and productivity, *and* can be cheaply made. Many guards can be designed and made by local metal workers using cheap materials such as leftover steel mesh, and used reinforcing rod or short bits of steel bar. But of course, safety should be the major consideration. As we have seen, if the workers cannot operate the machine effectively, they will remove the guard.

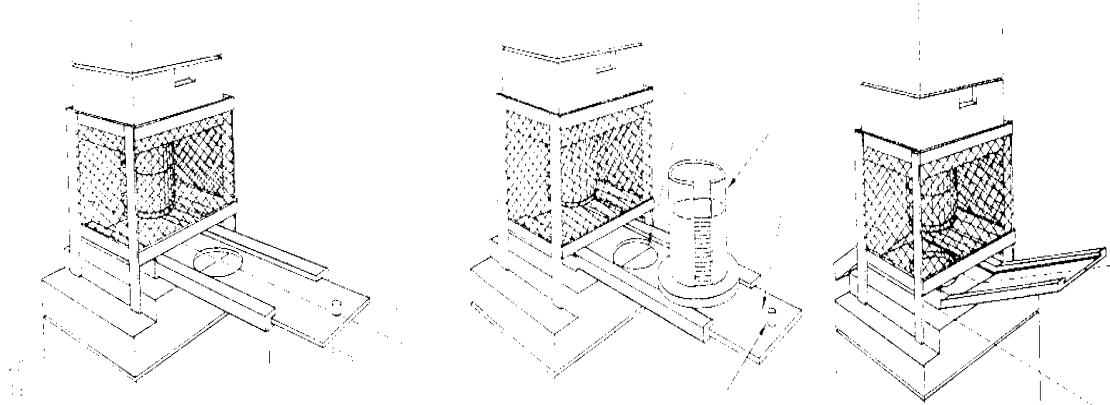
So, The best thing is to isolate all the pointy bits of the machine: that is, the so-called 'nip points' where one part rolls onto another (gears are a good example) or if a bit moves back and forth or pushes down, cuts, or bends or rolls. Don't just think of normal operations. Think of falls: if the floor is slippery and a woman slides or trips, where will her hand land when she automatically reaches out to grab for help? Sometimes her hands would land just on a wheel or a belt-drive that is at knee height. These are the bits that need to be guarded.

Do You Need to Use Guards? What are the Alternatives?

- The first thing is to make sure that all workers are familiar with the safe use of the machine. Sometimes that means being trained to certificate level, that is, the workers can only use a machine if they are authorised and certified. Crane and forklift operators, for instance need to obtain certificate of competency in most countries. Machinist and fitters as well. This training instills respect for the power of the machine and its relationship with the worker. It enables the worker to feel comfortable and sure about its operations. Never be afraid to admit you are not sure about how to work with a particular machine. It could cost you dearly to pretend!

- Sometimes using what are known as jigs or feeder devices removes the workers' hands or feet from immediate danger. Feeder and ejection systems both speed up production and remove the workers hands from the operating zone. Using hands to place and remove stock is time consuming and dangerous. Cheap systems to feed and remove stock from the machine can be devised by local tradespeople.

The simplest system to use is a **plunger feed** (see below). The plunger shelf has a hole cut in it and into which the stock is placed outside the area of operation. As the plunger is pushed, in it activates the press or other operation. The guard is still in place.

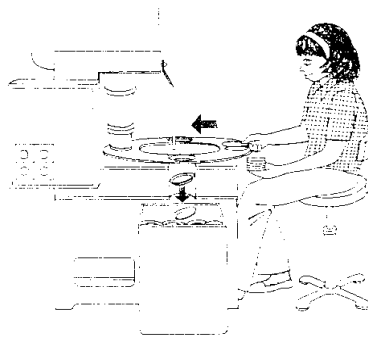


Power pressw with plunger feed

Power press with plunger and magazine feed

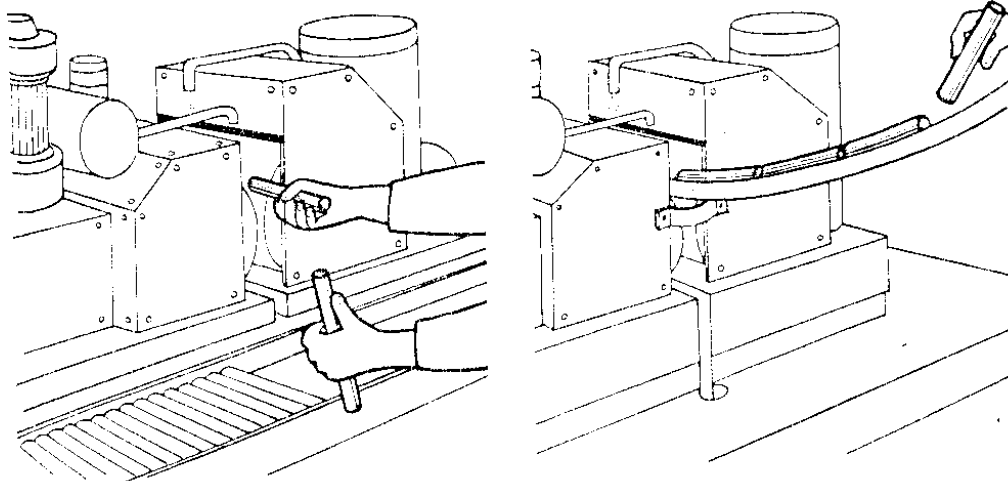
Power press with chute feed

A **carousel feeder** is like a merry-go-round at a circus or fun fair. It spins around delivering stock into the machine and allows a considerable increase in speed of production. Finished goods can be removed by hand at the side, out of range of the dangerous part of the machine or can automatically fall into a collector if designed right.



Power press with carousel feed

A **gravity feed system** is another low cost option and is one that can be used in ergonomics to deliver parts of stock easily. Simple upwardly bent chutes can be fixed to machines to feed in the stock. This works well with heavier components, mainly metal parts as they are less likely to be seized by friction, which can slow or stop the feed. But you can imagine how a well functioning system like this could speed things up.

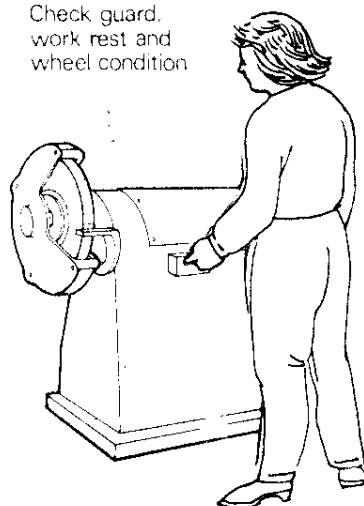


Steel pin grinding machine: (a) hand feed; (b) gravity chute feed

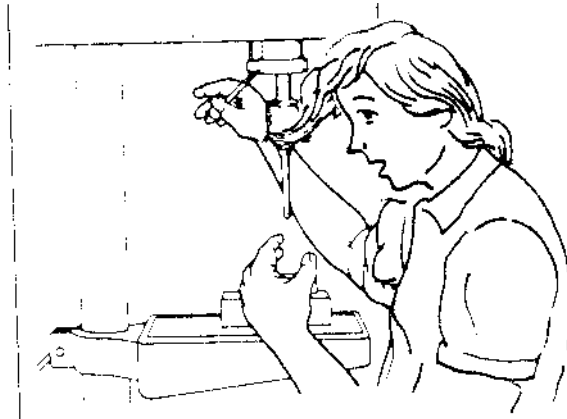
A Fruit Salad Of Other Things to Think About:

- Removing waste (sometimes known as swarf if its metal) from around a machine needs to be done with a broom or similar tool, NOT WITH YOUR HANDS. Make sure that the machine is turned off when cleaning it.
- Work to be trimmed or finished can be held in a jig or vice. Do NOT Use Your Hands!
- Keep you hair covered or tied back when using machines. Do not use flowing clothing such as sari's (a *shawal kameez* is better for work) or loose flowing Muslim head coverings as these can get caught in the machine and drag you into the moving parts..

Check guard,
work rest and
wheel condition

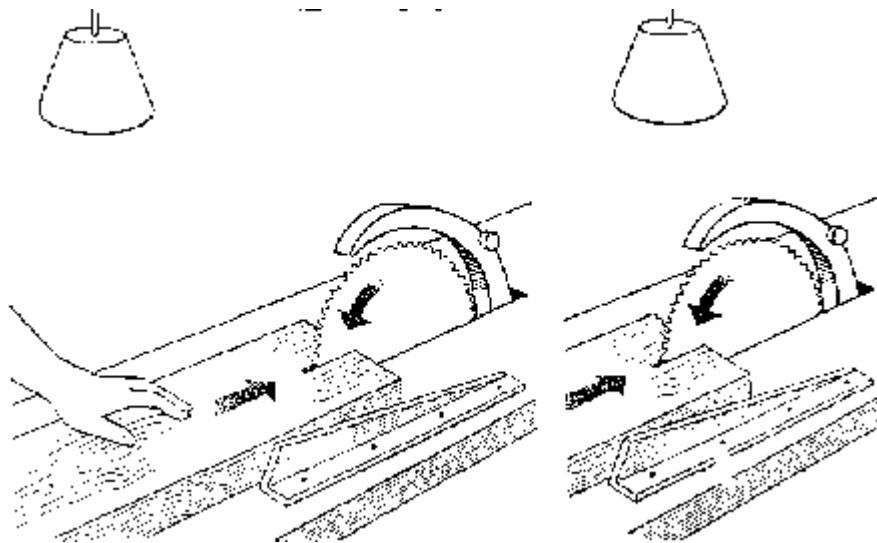


- Never start a grinding wheel until you have checked that the wheel is in good condition. Check that the guard and work rests are fixed in place and are properly adjusted and that no waste is left on the wheel (the waste might fly off at high speed when the wheel is turned on and is dangerous to you and others).



Unsafe Working – Hair and eyes unprotected

- Never allow a guard to be removed unless it is for maintenance. Make sure it is put back on securely before the machine is operated.
- Make sure the machine is well lit. Even a well-guarded machine can be dangerous if the worker cannot see what is going on.



Machine lighting

- Maintenance is important to machine safety. If a machine is not working well, the worker may be tempted to remove the guard to make it easier to get work done. In addition, failing machines demand extra effort and are tiring to use. Women may feel tense if the machine is slow and they are not able to keep up with the demands of the work flow system.
- When a machine is being maintained or is out of action, make sure it is labeled as such. Signs saying *Danger Do Not Operate* will discourage others from using it and taking risks.

Annex 14

IATA/ICAO Hazard and Handling Labels

Primary Hazard Labels

Class 1		Class 4
    	      	  
<p>* Articles bearing the Explosive labels shown above and falling into Divisions 1.1, 1.2, 1.4F, 1.5 and 1.6 are normally forbidden.</p>		<h3>Class 5</h3>  
<h3>Class 2</h3>   	<h3>Class 3</h3> 	

Primary hazard labels (cont.)
Class 6



Class 7



Class 8



Class 9



Secondary hazard labels



Handling labels



