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BANANA PESTICIDES LINKED TO ASTHMA

Pesticides used in the North NSW banana growing industry are suspected of causing breathing problems among children in the area.

The NSW Health Department is also investigating asthma in children and adults all over the state, a disease which is growing distressingly.

The northern NSW area has shown an abnormally high incidence of breathing problems among children. Last winter, twenty per cent of school students in one class had to resort to nebulisers in order to breathe properly.

The area has also been affected by other problems linked to banana pesticides: a birth defect rate of twice the state average has made parents genuinely worried. The Northern NSW area produces some \$50 million worth of bananas, or approximately 60,000 tonnes. Chemicals are used widely.

Although it is unclear what proportion of the breathing problems actually is asthma, the Health Department is nevertheless instigating a state-wide survey into the condition. From 1980 to 1987, the number deaths from asthma rose by more than 50% among both men and women in NSW. Between 1985 and 1987, nearly 1,000 people died in NSW from the disease.



Source: Mark McEvoy, Sunday Telegraph, 17 Jun 1990

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HOT UNDER THE COLLAR

Bakeries, foundries, smelters, railways, road works — they're just a few of the places where the temperature can get both uncomfortable and dangerous. Especially in Australia, conditions are often hot, heavy and humid, whether you're working indoors or out. The American magazine, Occupational Hazards, offers some insight into the physiological effects of heat, and what to do to avoid illness from excessive heat.

The human body's way to deal with heat is a very complex reaction. The body usually maintains a fairly constant temperature, notwithstanding the surrounding conditions. Normally, outside temperature is lower than the body temperature, and the body works to generate heat. However, when the external temperature rises, the body begins to cool itself down through a number of processes.

More blood is channeled through the capillaries just beneath the skin. As the blood circulates closer to the skin, it releases excess heat.

If this fails, the brain instructs the sweat glands to wet the skin. The perspiration evaporates, drawing heat from the skin surface and cooling it.

In high humidity, though, the evaporation of sweat is counter-acted, and the body can no longer find a way to keep its normal temperature.



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Symptoms

Heat rash (prickly heat) is a harmless disorder that is common in hot, humid environments. It is caused by the sweat remaining on the skin because it is not able to evaporate normally. The sweat ducts clog up, resulting in a rash. The ducts could become infected.

- **What to do:**

The way to avoid heat rash is to keep the skin dry, washing it regularly, and to rest in a cool place for part of the working day.

Heat cramp is a more serious condition. This occurs when the worker, who might be fit and sound for work in hot conditions, suffers a lack of salt.

When you drink great quantities of water, your body fluids become diluted. But the body continues to lose salt. The low level of salt results in cramps and pain, especially in the extremities and abdomen. However, tired muscles are the most susceptible.

- **What to do:**

Salted liquids will alleviate the problem. However, the American NIOSH says that salt tablets are not recommended.

Heat exhaustion is the result of loss of large quantities of fluid (and of salt) through



A T

sweating. Symptoms include extreme fatigue, giddiness, nausea, headache. Vomiting and unconsciousness may occur. The victim's skin is moist, either pale or flushed, while the body temperature is almost normal.

- **What to do:**
Rest in a cool place and drink plenty of fluids, Mild cases will pass within hours. Severe cases could last for days.

Heat stroke is the most serious problem resulting from work in hot places, It simply means that the temperature regulatory system has gone haywire, Dehydration is part of the problem, as is the shut-down of the body's in-built thermometer, Heat stroke means that the brain loses all concept of maintaining constant heat, and the body gives up on all heat-losing mechanisms.

That means that the body starts to retain heat instead of shedding it. Like in a faulty nuclear reactor, the core temperature begins to rise at an alarming rate,

Symptoms include hot, dry and red skin. The body temperature may reach 105F or more. The victim becomes confused and delirious, sometimes convulsing and unconscious.

Heat stroke is very serious, and can result in brain damage and even death. First aid must be administered immediately.

- **What to do:**
Take the victim to a cool place, soaked with water and fanned to maintain a cool temperature. Seek medical attention as soon as possible.

Prevention

The body is capable of sweating more than a litre per hour during strenuous work. That means about nine litres per 8-hour shift. This is part of the problem: the natural thirst mechanism will not support such a loss of fluid: you have to drink more than you feel like. The NIOSH recommended amount is about 0.3 litres of water every 20 minutes, The water should be cool rather than icy.

The constant fluid intake should be complemented with salt, unless the worker is fully acclimatised to hot, humid conditions. Salt tablets are not recommended: the best way is to add salt to the normal diet.

Alcohol aggravates the fluid loss, and should be avoided. A special mention is made about people taking blood pressure reducing medication, diuretics or water pills should consult their physician before undertaking hard work in hot conditions.

Gradual acclimatisation is important. The body can "learn" to cope with higher ambient temperatures. This can be accomplished within a week or two.

This becomes an important issue when it comes to new employees. If the person is unaccustomed to working in high temperatures, it is probably well worth introducing him or her



gradually to the hot conditions while working at a lower capacity than expected, Sudden work at 100% capacity in hot conditions can prove injurious or even lethal to a person who is not used to the temperature,

Some simple steps:

- **Open windows**
- **Install fans**
- **Create air circulation by other means**
Air circulation is a major contributor to cooling. We all know the "wind chill factor" on cold winter days, but what about the wind chill factor in a hot workplace? The moving air will transfer heat.
- **Create a work-rest schedule.**
This allows workers to get rid of excess heat, and lets the body slow down the production of internal heat. Resting also leads to greater blood flow near the skin surface. Work-rest cycles should be frequent.

Engineering steps

In many locations, a number of engineering controls can be implemented to reduce heat exposure to workers.

- **Mechanisation of work procedures**
- **Air conditioned booths**
- **Ventilation**
- **Heat shielding**
- **Insulation of adjacent walls (to a furnace etc)**
- **Exhaust hoods**

Protective clothing

Clothing serves as a barrier when the surrounding air is warmer than the body temperature. At the same time, it may hinder the body's ability to shed heat by sweating. This is often a problem in areas of high humidity,

Protective clothing should be selected carefully, depending on the specific surroundings. Insulating loves and suits, reflective "silver-suit" materials, and infra-red reflective shielding should all be looked at.

Extremely hot conditions may require artificially ventilated suits, driven by either self-

contained breathing apparatus or compressed air drawn from a remote source,

Certain garments go for more basic solutions, such as lots of pockets that can be filled with ice.



Source: Occupational Hazards Magazine, June 1990, Cleveland, Ohio, pp 63-65



Infrasound & ultrasound:

It's so noisy you can't hear it!

Sound waves oscillating less than 22 times per second are called *Infrasound*. There are many sources of infrasound at work, such as large diesel engines, piston compressors, steam exhausts, jet engines, vehicles and ventilation fans.

Infrasound can produce a feeling of uneasiness, nausea and fatigue. However, such high levels of infrasound are rare. Hearing protection does NOT work when it comes to infrasound.

Sound waves with a frequency of more than 18,000 Hertz are called *ultrasound*. Hearing damage resulting from excessive exposure cannot be discounted.

Equipment using ultrasound can produce sub-frequencies which may be very irritating to the human ear.

The use of ultrasound has increased dramatically in the past few years. However, it is simple to shield, and hearing protection muffs are an excellent barrier.

Another hazard associated with ultrasound is that high effect ultrasound machinery can cause tissue damage when touched.

INSULATE YOURSELF!

Insulation batts of inorganic fibres require special handling in order to stay healthy and comfortable. Synthetic inorganic fibres include glass wool and rock wool. Other synthetic fibres may occur, such as ceramic fibre.

The length and diameter of the fibre varies with the manufacturing procedure. Micro-fibre, of a diameter less than a thousandth of a millimetre, are comparatively rare, and are not used in certain countries. However, micro-fibres may occur as a small constituent in other fibre batts.

Most insulation is made up of fibres of varying length and diameter. However, Continuous fibres may be used in special applications.

What are the risks?

The risk of illness or discomfort in connection with synthetic fibres depends on the structure and size of the fibres. Handling insulation products of glass or rock fibre is not considered capable of causing any serious disease through inhalation.

However, inhalation of large amounts of fibres for long periods could prove hazardous.

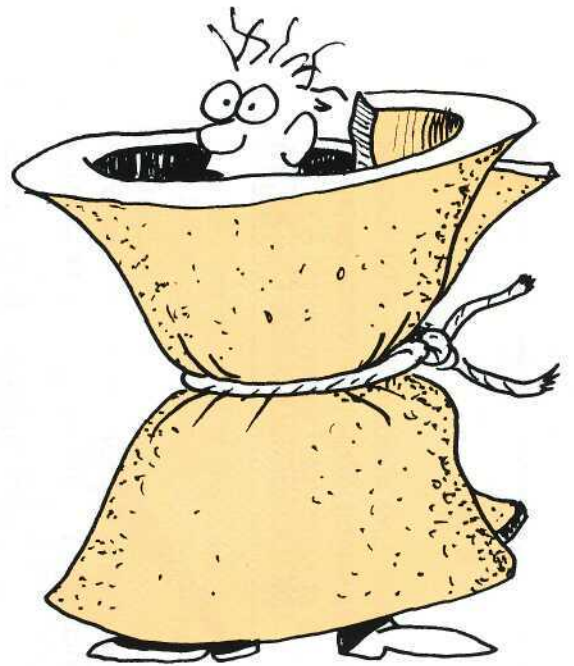
Tobacco smoking will exacerbate the risk. The mucous membranes in the upper respiratory tract could become irritated if you inhale air containing fibres. The result is coughing and throat discomfort.

The skin may be affected by many fibre products. Sensitivity varies between different people. Large fibres with a diameter of more than 5 microns are the most irritating. The skin condition can last for several days after exposure, for instance, during the weekend.

People with eczema may suffer aggravated discomfort due to exposure to fibres.

Use protective clothing

Always use protective overalls when working with fibre. When spraying loose fibres, special clothing without pockets and collar should be worn.



Do not store protective clothing together with normal clothes.

Use breathing equipment

A good particle mask with a high efficiency particle filter is the best protection. If other materials, such as paints, glues, and solvents are used, the appropriate type of gas filter should be selected and used together with the particle filter.

Wash after work

The whole body should be washed after work. Opinions differ as to the best way: some say that soap and water works – others claim that a really cold shower gets rid of all the fibres.

Allergies

Oil and phenol formaldehyde plastic are normally added to the fibres in order to reduce dust. These additives could produce allergic reactions in some people.

Handy work procedures

- **If at all possible, select the fibre with minimal dust properties.**
- **In the workplace, dust can be reduced through careful handling and by using the appropriate tools.**
- **Point exhaust can be fitted to hand tools.**
- **Cutting should be done with a non-serrated sharp knife.**

(Continued page 8)

EYE SAFETY - A VISION OF IMPROVEMENT

About 10% of industrial accidents are eye injuries. About 12 per cent of all eye injuries are caused by welding sparks. The rest are caused by particles, chemicals, or direct mechanical impact. Eye damage that requires the victim to stay home from work are 2.5 times more common in the manufacturing industry than in other areas. Every incident results in five days' sick leave on average.

The first measure in eye injury prevention is to fit machinery with shields and point vacuum exhaust, where possible. However, this is not always feasible, especially when it comes to hand tools.

Eye protection should be comfortable, since it is worn during much of the day. The field of vision should be as wide as possible. Tinting and shaping can work to prevent irritating reflections in the glass, Lenses should be scratch-resistant. Most importantly, the protection gear should fit the wearer comfortably.

RISKS

INSTALLED EQUIPMENT

EYE PROTECTION

Grinding with hand tools

Air-borne hot metal particles. May come from various directions. May bounce and ricochet. May be red hot.

Point exhaust may sometimes be fitted to the hand tool.

Goggles, visor or protective spectacles with side shields.

Dry grinding with fixed machine

Air-borne hot metal particles. May be red hot.

Shielding glass plate. Must be kept clean and free of scratches. Good lighting is essential. **Local exhaust** can remove most of the spray.

Protective spectacles may suffice if the fixed shields are appropriate. If there are not shields fixed to the machine, goggles or visor should be worn.

Grinding with cooling fluid

Splashes and small particles.

Open machines may be fitted with a **shielding glass plate**. Machines may also be enclosed.

Open machine: Protective spectacles with side shields. Goggles. **Enclosed machine:** Goggles or visor needed when blow-cleaning with compressed air.

Lathe, reaming, drilling etc.

Air-borne steel fragments. Long, hot particles from other materials.

Machine may be enclosed.

Unshielded work: Protective spectacles with side shields or visor. **Enclosed machine:** Wear spectacles with side shields or visor when cleaning the machine. Goggles or visor should be worn if power-cleaning with compressed air.

Blow-cleaning with air

High speed air-borne fragments. Unpredictable direction and motion.

In certain cases, a protective shield may be fitted to the nozzle. Local vacuum is less risky.

Goggles or visor.

Smoothing after welding

Air-borne, hot, hard, sharp particles.

None.

Protective spectacles with side shields. Welding shield with flip-up shield over a clear visor.

Exposed sandblasting

High speed air-borne particles. Unpredictable direction and motion.

None.

Goggles or visor. If breathing protection is used, a protective hood or full face mask may be used.

Handling chemicals

Splashes and spray that cause eye irritation or corrosive damage. Hot fluids may cause burns.

None.

Goggles or visor. Gas tight goggles may be required. Compressed air hood or full face mask provide excellent eye protection. Important: check the chemical resistance of the equipment.

Working from underneath

Particles, scales, rust, dust falling into the eyes.

None.

Protective spectacles with side shields, goggles or visor. Selection depends on the nature of the work.

INSULATE... (Cont. from page 5)

- If possible, install sheets from above to avoid fibres falling down on the worker.
- Use protective clothing and respiratory protection
- Remember that not only the installation worker is exposed to fibres — the dust spreads easily, and other people in the vicinity may also be affected.

Keep that vacuum goin'!

Frequent cleaning is essential. Spills and waste that are left on the floor will create a lot of fine dust when walked upon.

Do not sweep the dry dust: it only creates clouds of tiny fibres. Vacuuming is the best method. You can also sprinkle water on the dust to bind it, and then collect it,

If silica or asbestos dust is present, a micro-filter must be fitted to the vacuum cleaner.



Source: Swedish Work Safe Directorate 1988, publication ADI243

VOICES ON SAFETY

Sweden has long been considered to be in the vanguard in industrial safety. Here, a few Swedish managers and safety officers present their views on safety in general and what their companies have achieved in particular.



SAAB, Linköping

At SAAB's aircraft division, a special chemical work-group has been set up to scrutinise new chemical products that are about to be accepted

for use in the company.

"We're a high-tech company", says Lars Sandgren, manager of the chemical inspection group. "That's one of the reasons why we started early on this program. For instance, we were quickly acquainted with epoxy products".

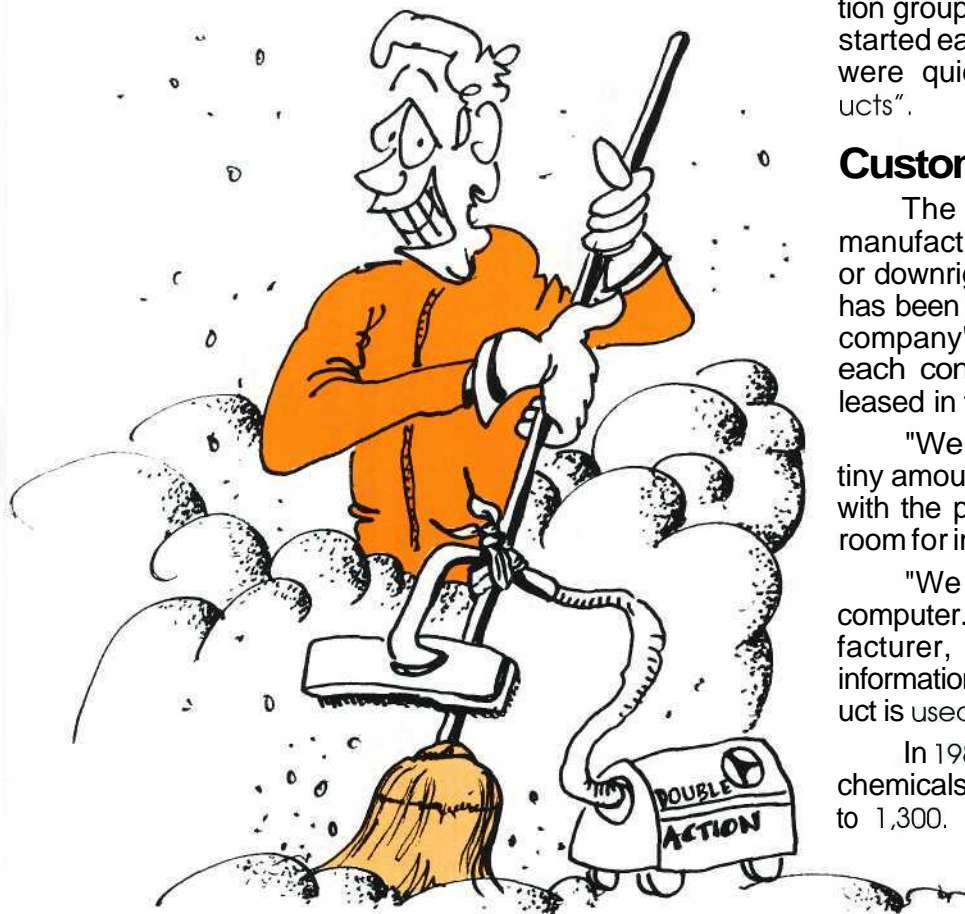
Customised marking

The feeling at SAAB is that the manufacturers' marking is often inadequate or downright poor. A special marking system has been devised to combat the problem: the company's own labels are always attached to each container before the chemical is released in the workplace.

"We label every batch of glue mix, even tiny amounts. We have also come a long way with the product information, but there is still room for improvement", says Mr Sandgren.

"We have a complete inventory on the computer. It includes the name of the manufacturer, our own internal identification, and information on the sections in which the product is used."

In 1980, SAAB had about 3,000 hazardous chemicals. Today, the amount has been cut to 1,300.



"When the inventory was made, a large number of products could be eliminated. All the chemicals used in the company today have been cleared by the inspection group. It took us about two years to create the inventory.

"Besides, we work continuously on improving the handling of chemicals in the company. Often, we call in the Government Work Inspection to advise us. That's a teamwork that really works."

Costs and rewards

The inventory has cost about one person-year in actual work, says Mr Sandgren. It will cost about two months' wages annually to maintain a current inventory.

Better control and improved handling of chemicals are the major benefits of the system.

"The awareness of chemical risks has increased enormously over the past five years", says Mr Sandgren. "But there are other advantages, like big financial savings in reduced paperwork and administrative costs in regard to ordering and purchasing."

BAHCO Skelleftea



This company employs 420 people, producing and marketing cylinders and valves. In 1977, an inventory was started. Each foreman and safety officer was given the task of surveying his or her own section of the company.

Mr Gunnar Carlsson has been responsible for the program since its inception. He heads a group of professionals who look at all new chemical compounds that are needed, and select the best one from a safety point of view.

Each employee has access to chemical data sheets on all products used in the section in question.

"The big advantage is that we've been able to reduce the number of chemicals, and that safety awareness has increased dramatically", says Mr Carlsson. "Before, workers knew absolutely nothing about the risks, and we had great problems trying to explain the degree of danger associated with each compound. Nowadays, our employees trust the data sheets."

MORA MAST, Mora

Mora Mast employs 30 people, manufacturing lighting systems for roads. The company suffered from a lot of sick leave because of skin rashes and other allergic symptoms.

A thorough survey revealed that lubricants were causing the problems,

Mr Stig Hokerud explains: "We tested a variety of lubricants, and in the end we discovered that ordinary soap was by far the best substance to use.

"Soap worked just as well as the other materials, and we got rid of our problems. The survey of our chemical stock proved to be a real money and people saver."

OBBOLA LINER BOARD, Obbola



Mr Hans Lindgren is the safety engineer at Obbola, where 540 people are busy manufacturing liner boards for paper packaging. In 1981, a chemical investigation group was formed.

"Thanks to our safety officers, we've come a long way", says Mr Lindgren. "We have reduced our stock of chemicals by 30%."

The cost of the program was substantial, but the result outweighed the initial down payment, claims Mr Lindgren. Main benefits include more effective purchasing routines, improved handling, and minimised spill & waste.

He also stresses the difficulty in prioritising the hazards of various chemicals. Safer handling is Mr Lindgren's solution. Manual mixing is no longer performed in the company.



Source: Swedish Work Safe Directorate 1988, publication AD1291



Q&A on solvents

- Why are solvents hazardous?**
- How do solvents enter the body?**
- Are all solvents equally hazardous?**
- When should you use breathing protection?**

Solutions on solvents from...

...Irma Astrand, professor and manager of the Work Environment Institute

- **Why are solvents hazardous?**

Solvents dissolve fat. This is part of the reason why they are used, and part of the reason why they are hazardous if they enter the body!

Brain cells contain a fair bit of fat. Seeing that the brain works pretty much like a sponge, soaking up solvents, things get dangerous.

- **Can't the body break down the solvents?**

Yes, it can. The liver in particular is able to break down many solvents. However, the substances derived from the breakdown can be even more hazardous than the original solvent,

- **Are all solvents equally hazardous?**

No. Besides, some have greater trouble entering the body. If you have to use a solvent, it's best to select a solvent that's as safe as possible.

- **Which parts of the body are damaged by solvents?**

It depends on the solvent. Brain, bone marrow, liver and kidneys are vulnerable. The

most common effect is damage to the nerve system.

If a lot of solvent enters the system, the immediate symptom is a sense of drunkenness, just like being intoxicated by alcohol (which is also a solvent). Reaction time gets slower, you feel clumsy. Your judgment is affected, which in turn leads to increased risks in many jobs.

- **Does this mean that the injury is only short term?**

No. Certain solvents may produce permanent damage. Similar to long term alcohol abuse,

- **How do the solvents enter the body?**

The most common way is through the air we breathe. Solvents follow the same route as the oxygen we need to live. That is, through the lungs and blood to the various organs.

The transfer from the air to the blood occurs in the millions of small alveoli in the lung. The combined area of the alveoli in an adult set of lungs is between 75 and 100 square metres.

Strenuous work means more solvents

The more air you breathe, and the more blood is pumped through the lungs, the more solvents will enter the body,

People who have a physically hard job are more exposed to solvents than others. A

worker who walks and stands up can absorb three or four times as much solvent as a sitting worker,

Some solvents are capable of permeating the skin and entering the blood stream. After that, they may be transported to the body organs. Therefore, it is very important to prevent direct skin contact with liquid solvents.

- **When is the solvent eventually eliminated?**

It can take a long period, so long that the body doesn't manage to neutralise everything during a night, or a weekend. This is very



serious, because it means that the body is in a continuous working mode. Thus, the amount of solvents in the body organs can accumulate during the working week, for instance.

Solutions on solvents from...

...Lennart Holm, manager of the chemical bureau of the Work Safe Directorate

- **How can you tell that your choice of chemical isn't unnecessarily hazardous?**
By studying the chemical data sheets supplied by the manufacturer.

- **What are the common deficiencies when it comes to handling solvents?**
Sloppy handling that produces a lot of air pollution, a lot of skin splashes, and — at worst — clothing moistened by splashes.

- **Is the work environment safe as long as you keep below the threshold limit values for solvents?**

Normally, yes. However, individual differences may exist, which means that certain people in a large group may experience discomfort. Special attention must be paid to places where several solvents are used simultaneously, and one must make sure that the combined effect doesn't become greater than the effect of one single solvent at the threshold limit value. Generally, you should always strive to keep air contamination as low as possible.

- **When should breathing protection be worn?**

At temporary work where other measures won't help. For example, break-downs, cleaning, repair and other relatively short term activities.

- **In which way have the regulations on solvents changed in the past five years?**

In many ways. For instance, the threshold limit values for solvents have been cut in sev-

eral cases. And regulations have been issued on air pollution, technical measures, handling and information for employees.

- **Are there many new solvents introduced on the market that are less harmful but as effective as the old ones?**

Rarely. On the other hand, usage and handling methods are developing for greater efficiency and better work environment.

- **Is the legislation on solvents a battle between employers and employees, or is it a work environment problem everyone is in agreement over?**

I know that the parties are in complete agreement about the importance of reducing the exposure to solvents in the workplace in whatever way possible.

- **Do you think that fewer solvents will be on the market in the future?**

No. Nor do I think that's worth striving for. The important thing is good information and knowledge about the health effects and physical properties of solvents. That way, you can select the best solvent for the work environment, and which also fulfills its purpose.

- **If solvents occur in my workplace, what considerations should I have?**

Design the equipment and perform the work in order to minimise the amount of solvent in the air (and eliminate it if possible) and that skin contact is avoided.



Source: Swedish Work Safe Directorate 1988, publication ADI210

Hints for a safer work environment

- Avoid chemicals in dust or powder form. If available, select flakes, granules, pastes or solutions.
- Connect refuse bins to exhaust systems.
- Ensure that mixing, blending, agitating, stirring and heating are done in enclosed equipment or near local exhaust. Chemical hoods and cabinets are good solutions.
- Make sure that adding and dosing from storage containers to process vessels are

done in as enclosed environment as possible. Pumps for liquids and solids are a good measure.

- Select the appropriate personal protection equipment, and make sure workers know how to use it. Remember that PPE often is a consumable: it needs to be replaced regularly.
- Be prepared for an emergency. Make sure people know the first-aid procedures. Check fire fighting equipment and medical gear is in top condition. Emergency showers and eye rinsing stations may be required. Exits should be marked clearly (many chemicals affect vision), and staff should know their role and actions in a crisis.



Source: Swedish Work Safe Directorate 1988, publication ADI291



*A housewife in rural Mt. Weiss
Wore a gas mask and goggled her eyes
With muffs on her ear,
and fireproof gear,
She proceeded to cook her french fries*

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