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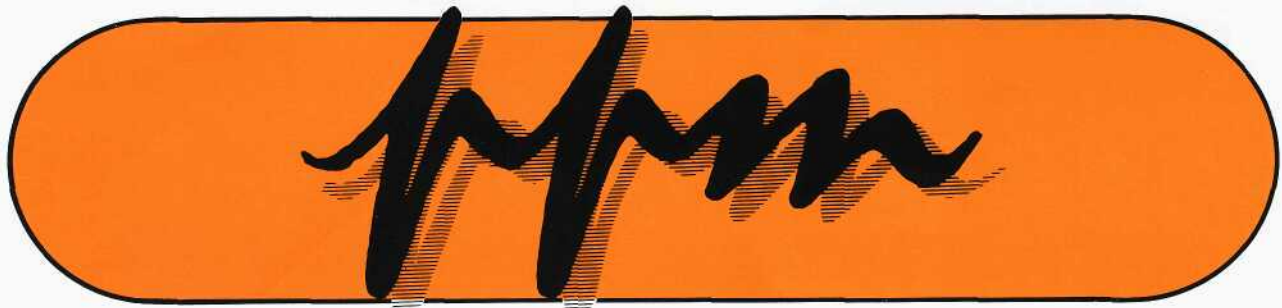
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## We missed you, too!

You may have noticed that the regular Autumn issue of Professional Protection Magazine never arrived in your mailbox. Due to unforeseen circumstances, we were forced to "skip" one issue.

However, from now on, things should get back to normal, and subscribers will receive their PPM on a regular basis again.

To make up for the missed issue, this copy of PPM has been extended to twice the normal number of pages. We hope you enjoy the contents.

As an extra bonus, we have included the most popular wall chart ever published in PPM: **SOLVENTS — do you know the dangers?**



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# Up in smoke...

## Did you know these facts on smoking?

- Tobacco kills at least 3 million people every year - that's about the population of Sydney.
- 90% of lung cancer deaths are caused by tobacco use.
- Up to 25% of coronary heart disease and fatal strokes are attributable to smoking.
- Spontaneous abortions, premature births, still-births and neonatal deaths are more common in mothers who smoke during pregnancy.
- Smoking during pregnancy can cause developmental problems in the child.
- Non-smoking tobacco (snuff, chewing tobacco) are a major cause of oral cancer.



- Burning cigarettes and pipes are a leading cause of fires resulting in property damage and personal injury or death.
- Smoke can mix with chemicals in the workplace, each adding to the harmful effects of the other.
- Cigarette smoke is rich in formaldehyde, acrolein, benzene, ammonia and nitrogen oxides — all harmful substances.
- Smoking adds to the health effects of many substances.
- Some substances may be absorbed by cigarettes, only to be inhaled by the smoker when lighting up, and causing permanent lung damage.
- Cigarette smoke contains more than 4,000 chemicals.

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Source: WorkCover News No12 1992 (quoting World Health Organisation)



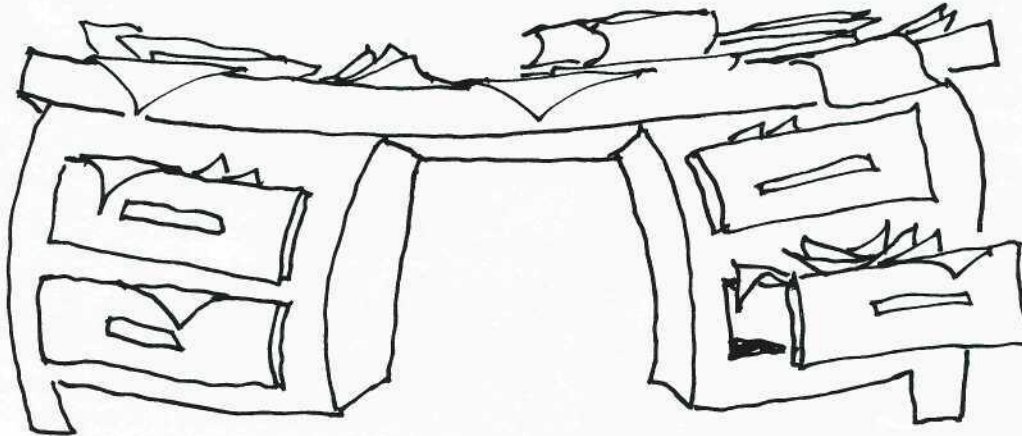


# All hands on desk!

*Your skin is like an expensive mahogany desk. Why? Read on...*

Imagine being an owner of an old, stately mahogany desk. How would you take care of this priceless piece?

- If you neglect it, it will soon dry out, blisters may appear, and the drawers will stick.



- If you clean it with strong detergents, the surface may become discoloured and dull.
- If you scrub it with steel wool and abrasive scourers, your desk will become scratched and ugly.

## On the other hand:

- If you polish it regularly, the surface will stay clean and strong.
- If you rub mahogany oil into the wood, it will stay soft and it won't dry out.
- If you add a layer of protective varnish, the surface will remain resistant to stains and damage.

## What's this got to do with skin?

Your skin needs the same care as the desk:

- Add a protective layer by using a protective cream.

- Use soft, gentle, non-abrasive cleaners to wash your skin. Harsh cleaning and the use of solvents will damage your skin, dry it out, and make it susceptible to irritation and infection.
- Apply after-work cream. This will keep your skin supple and moist, and prepare it for the next working day.

## What about gloves?

Gloves provide good physical protection for your hands. But to get back to your mahogany desk, gloves are like putting a tablecloth on the desktop. It will protect it from physical damage, but you still need to look after the

desk underneath.

You skin perspires inside gloves and boots. The constant film of water wears your skin down and makes it more vulnerable to chafing and chapping.

## How to apply protective, cleaning and after-work creams:

- Apply cream to *dry* skin
- Rub in thoroughly *without* using water. Pay special attention to your nails, your cuticles, and the area between your fingers. Gently rub nails against the palm of the other hand. Fold your hands together, as if praying, and move them around.
- (Cleaning creams:) Add a small amount of water and keep rubbing until lather appears.
- (Cleaning creams:) Rinse very thoroughly.

# YOU CAN GIVE A MASK TO A WORKER...

...but can you make him wear it?

*Respirators are getting better and better. But after making the best selection comes the most important task: getting people to wear them. Is there a way of making respiratory protection programs more user friendly? American safety experts give their advice:*

It is a well-known fact that people do not like to wear respirators. No matter how well designed, a mask will always cause a certain degree discomfort.

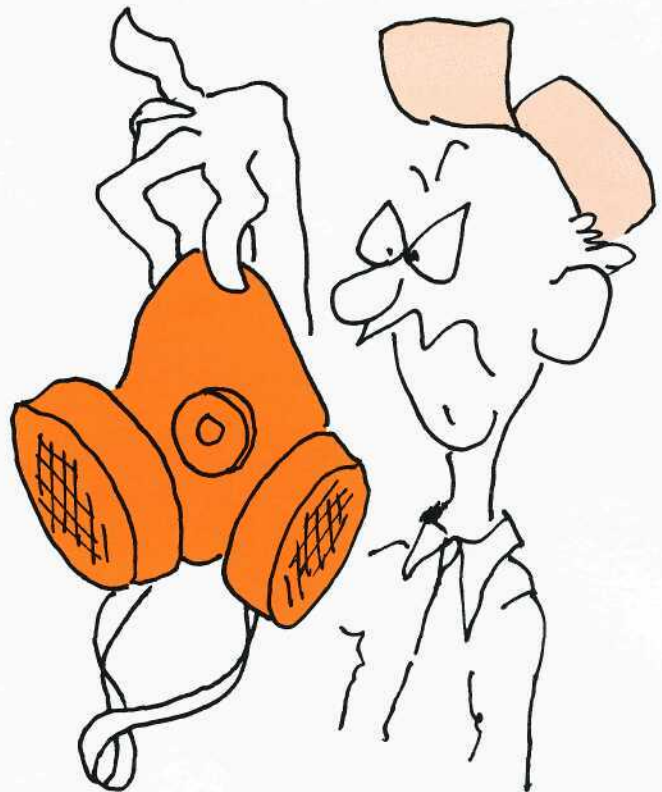
## Hazard control

Any respiratory protection scheme has to have as its primary objective to control the hazard in order to get rid of the respirators.

Only if you are unable to eliminate the problem through engineering or substitution of the chemical should you introduce personal protection.

Find out as much as possible about the hazards. Their characteristics, concentration, and use in the operation.

This may entail much more than just reading Materials Safety Data Sheets on the various products, and may involve more than a contaminant sampling analysis. For instance, some chemicals, such as xylene, can actually "kick" other chemicals (such as acetone) out of the filter, resulting in a paradoxical effect: the mask wearer will inhale a higher concentration of acetone through the filter than is present in the surrounding air. In other words, you would inhale more acetone by wearing a mask. (This effect was discovered by Young & Nelson in



1990 - see PPM 3/91 for an article on their study.)

## Communication

The first thing to do is to establish frank, no-nonsense communication about protection. The more you talk about respirators, the better people feel about it. Workers should know why they should wear respirators, and the price they will pay for failure to wear them.



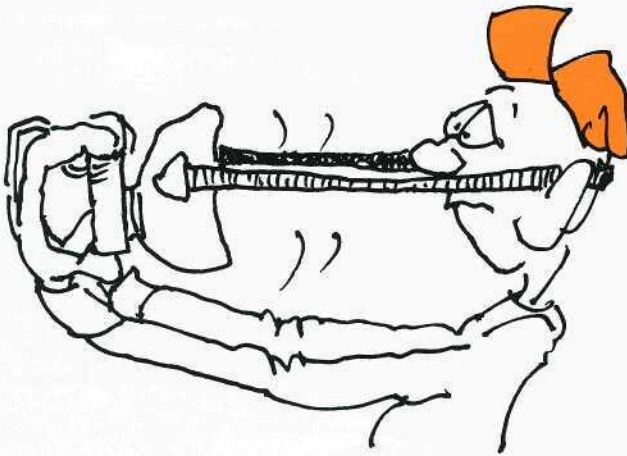
## Solid training

Simply distributing respirators to the employees and telling people to wear them isn't enough. Users should know the proper use and maintenance procedures, correct fitting techniques, daily leakage testing, and so on. They should also know about the hazards against which they are protecting themselves. They

should know which filters and filter combinations to use for particular contaminants.

You may also wish to give employees a choice of various respirators, or a choice of sizes. There are few work places where the same mask will comfortably and securely fit everyone on the floor.

In any case, individual fit testing will conclusively establish that employees are able to achieve adequate protection factors.



After the training session, mask users should know how to:

- **Fit the respirator**
- **Detect leaks and any defects**
- **Identify the correct respirator/filter for the job**
- **Recognise when filters need replacement**
- **Inspect the respirator for wear and tear (including valves)**
- **Clean, maintain and store the respirator**

## Mask fit

Respirator fit does not always enjoy the priority it should have. Users often develop bad habit, not fitting the mask properly, wearing it too loose or too tight, fastening head straps around hard hats, and other misuse.

Even if respirators are worn for nuisance rather than toxic hazards, they should be maintained and fitted properly.

Laxness about improper use of respirators will affect the integrity of the entire safety program throughout the organisation.

## Attitude

Breathing hazards are not as apparent as physical hazards that cause immediate damage. For instance, getting people to wear spectacles is much easier than getting them to wear respirators: a splinter in your eye feels much more real than contracting a respiratory disease five years down the track. The splinter even hurts as you think about it.

## Hands-on training

Respirator training should be practical and real. Just showing a video and sticking up some posters in the work area is not enough. Staff need to feel and touch the masks, they need to try them out.

Fitting and cleaning should be learnt through supervised hands-on operations.

## Follow-up

Procedures should be reviewed regularly, and the correct use and maintenance should be monitored through occasional safety checks.

Check regularly that the respirator program is actually working. Is other safety equipment, such as goggles or hard hats, making respirator wear difficult or uncomfortable? Are there other factors that influence respirator use?

First and foremost, safety personnel must listen to users' comments, problems, wishes and complaints. Secondly they must be sensitive to the comments, and actually do something about any problems experienced by employees.

Otherwise, the only time the respiratory protection is worn is when supervisors are around.



Source: S L Smith, Occupational Hazards, Nov 1991, p39-42.



# Are disposable masks easier on the breathing?

New research explores disposable wear

*Disposable respirators may seem easier to breathe through than filter half masks. But a new study finds that the use of disposable respirators cause significant physiological costs, especially at moderate to hard work.*

When it comes to breathing resistance, there is ample literature on self-contained breathing apparatus (SCBA) and negative pressure filter respirators. However, there is precious little, if any, documentation on the use of disposable single-use masks.

Jeffrey G Jones of the St Francis Occupational Health Centre and Department of Medical Education in Beech Grove, Indiana, set out to evaluate the physiological effects of disposable respirators.

## Why disposable?

Disposable respirators are popular because of their light weight, comfort, and low profile. They are generally easy to use and breathe through, and allow the wearer to speak through the mask. Naturally, the most important benefit is that they require no maintenance — they are simply discarded after use.

All respirators, disposable or not, have certain effects on the wearer: they impose a certain breathing resistance, they increase the

dead air space in the respiratory system, they cause heat stress on the body, and also stress on the cardiovascular system.

## The test

A number of volunteers were chosen for the test. They were fit, healthy, clean-shaven, and were able to wear the respirators in the prescribed way.

The test, performed on a treadmill, was a quantitative test, using two probes in the respirator. A number of body functions were also monitored, such as blood pressure, heart rate, breathing rate.



## The results

The test showed clearly that heart rate, breathing rate, blood pressure and temperature were all significantly affected by respirator wear. The harder the test person worked, the greater the difference in physiological functions. Although there were already differences at complete rest.

Breathing rates at light, moderate and heavy work increased significantly: At light work, breathing rate when wearing a disposable respirator was about 20 breaths per minute, compared to a low 12 breaths without a mask. At heavy work, breathing rates were

around 19 breaths/minute without a respirator, which grew to 30 breaths/minute when a disposable respirator was fitted.

The systolic blood pressure increased by up to 32 mmHg when wearing a disposable respirator (this is a clinically significant increase).

The temperature, measured directly in front of the face, rose by about nine degrees at heavy work, and by approximately seven degrees at light work. The average heat stress throughout the test was about 7.5°C.

Jeffrey Jones believes that it is the dead air space in the mask that causes the physiological effects.

The main cause of complaint among the test persons was heat stress, imposed by the respirator.

## Conclusion

The report concludes that, although disposable masks are not viewed as imposing any significant stress on the user, the test showed a variety of factors that could affect the physiology of a respirator user:

- **Inhalation resistance**
- **Exhalation resistance**
- **Dead space**
- **Heat stress**
- **Respirator-associated anxiety**
- **Irritation**

These factors caused increases in the following body functions:

- **Breathing rate**
- **Heart rate**
- **Blood pressure (systolic and diastolic)**



Source: Jeffrey G. Jones, American Industrial Hygiene Association Journal (52)/June 1991

## KNOW YOUR ISOCYANATES!

**Chemicals are often referred to by their abbreviated names. This may make you forget that the chemical is a hazardous one — such as the case with isocyanates:**

### HDI

Hexamethylene di-isocyanate

Formula:  $(CH_2)_6(NCO)_2$

Aust. exposure level: 0.02 mg/m<sup>3</sup>

Liquid. Highly irritating to skin and eyes. Common health effect: blepharconjunctivitis.

### MDI

Diphenyl methane di-isocyanate

Formula:  $CH_2(C_6H_4NCO)_2$

Aust. exposure level: 0.02 mg/m<sup>3</sup>

White to pale yellow crystals. Slightly soluble in water.

Harmful at temperatures approaching 75°. Poisoning most common when used in liquid aerosol form.

### MIC

Methyl isocyanate

Formula:  $CH_3NCO$

Aust. exposure level: 0.02 mg/m<sup>3</sup>.

Colourless liquid. Sharp odour. Causes tears.

Nose and throat irritation, coughing, chest pain, impaired breathing, asthma.

### NDI

Naphthalene di-isocyanate

Formula:  $C_{12}H_6N_2O_2$

Solid. Poisoning may occur after exposure to fumes when heated over 100°.

### TDI

Toluene di-isocyanate

Formula:  $CH_3C_6H_3(NCO)_2$

Aust. exposure level: 0.02 mg/m<sup>3</sup>.

Water-white liquid. Turns straw-coloured on standing. Fruity, pungent odour.

Conjunctivitis, irritation to throat, dry cough, esp. in the evening, chest pain, wheezing, impaired breathing, distress. Exposure to low concentrations over a long time can lead to asthma.



Sources: Encyclopædia of Occupational Health & Safety (ILO), Black's Medical Dictionary, Worksafe Exposure Standards 1990, Worksafe Guide to Isocyanates, 1990



# Aussie youth bash their ears with rock

*Many young Australians have sustained hearing damage through loud music, according to new research. The rate of ear "ageing" is four or five times greater in 16–24-year-olds than in people 30 years and over.*

A recent study at Sydney's National Acoustics Laboratory shows that on average, today's 24-year-olds have the hearing of 53-year-olds.

This is a disturbing trend which, if the deterioration continues, will result in at least 500,000 youths will have communication problems due to hearing loss within the next decade.

A new testing method was used to examine 800 people, ranging from babies to 83-year-olds. The method allows the



measurement of ear activity without requiring any subjective response from the test person. The technique also detects hearing damage long before conventional audiometric tests.

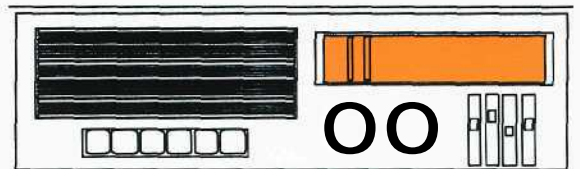


The study cannot conclusively establish that the hearing loss in young people can be attributed to loud music at discos, concerts and in headphones. However, the likely cause is believed to be leisure noise.

Another study from Canberra showed that people attending a local disco had experienced temporary, but significant, decrease in hearing performance. This was measured over three hours in a disco where not very loud music was being played. The deterioration was dramatic on the day, but most test subjects had recovered by the next day. However, some participants recovered very slowly, and were still affected after three days. One participant's hearing was permanently "aged" about eight years.



**Source:** Deborah Smith, science writer, Sydney Morning Herald, 3 Dec 1991 (from Dr Eric LePage, senior research scientist, National Acoustics Laboratory).



# Rubbery test?

## Silicone vs Natural

*What is your choice: silicone respirator or natural rubber? A recent study shows that there may be much more to the choice than comfort and personal preferences.*

Filter respirators have undergone a dramatic development period in the past decade. Filters have become more efficient, yet easier to breathe through. Face pieces now provide better seal than before, and often come in two or more sizes to better accommodate different users. Head and neck straps have been improved to cradle or yoke designs for better weight distribution and more secure fit.

One important development is the introduction of silicone rubber masks.

Silicone masks are said to be more comfortable, lighter, easier to clean, and more durable than natural rubber.

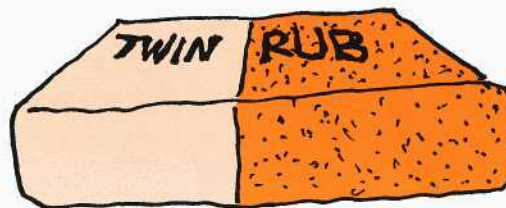
It is true that silicone is more pliable than natural rubber, and it is therefore assumed that users can achieve better fit and increased comfort from such a mask. Silicone also offers more chemical resistance. However, natural rubber may be more tear-resistant than silicone.

But what about fit factor? Can a silicone provide better protection than the same mask moulded from natural rubber?

The answer, according to a test conducted at the University of Alabama, is yes: silicone gives significantly better fit than natural rubber.

## Same mask, different materials

The test was a quantitative test, involving half masks of identical design—half manufactured from silicone rubber, half from natural rubber. The masks were made in the same mould. The test entailed 360 different measurements (3 measurements on each mask by 45 test persons).



## Results

The study showed that the silicone mask provided a significantly better average fit, as compared with its natural rubber twin. However, when it came to actual test-by-test values, the natural rubber mask showed higher maximum and minimum fit results than the silicone mask. Similarly, the *variation* in fit from one test person to the next was greater in the silicone mask.

Although the test did show that **most** people gain better fit from a silicone mask than from a natural rubber mask, the outcome also emphasised the importance of individual mask fit testing.



**Source:** R K Oestenstad & A M Zwissler: A comparison of fit provided by natural and silicone rubber facepieces of the same brand of half-mask respirator. *Appl. Occup. Environ. Hyg.* 6:1991, pp785-789.

## ELECTRICITY BLUES:

*Boy, pliers,  
electric wires;  
Blue flashes  
Boy — ashes.*

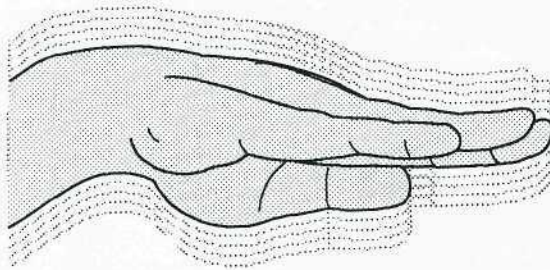


# White fingers:

## Can you feel the vibes?

*Every third auto-mechanic may suffer "white finger" from vibration, according to new Scandinavian research.*

To date, the study is the most comprehensive research program conducted in the world. The study concerned "white finger" among car mechanics, otherwise known as the *Raynaud phenomenon*, caused by vibration, for instance from power tools used to tighten and loosen wheelnuts. The condition manifests itself by a dramatic lowering of the



blood pressure in the fingers, resulting in white discoloration of the fingers, numbness and diminished sense of touch.

There is no known cure for the condition, other than to stay away from vibration.

The study also attempted to establish the significance of how many years the people had been working with vibrating tools, their age and smoking habits.

A large cohort of over 900 auto-mechanics were surveyed. The proportion of white finger increased with age, number of years in the profession, and nicotine consumption. There

was not great difference between truck/bus mechanics and private car mechanics.

On average, some 25% of workers with 10-20 years' in the trade suffered from the condition. One in three workers over 40 were diagnosed with white finger. However, the researchers believe that the proportion is greater than that, due to unawareness and failure to report the condition.

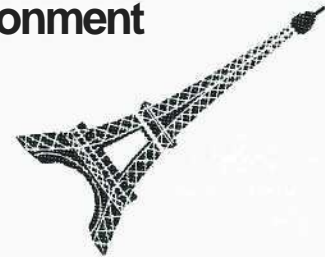
Authorities point out that the name "white finger" is an unfortunate description of the condition: the fingers turn white in the late stages of the disease, and the numbness and diminished sensitivity of the fingers can be detected at a much earlier stage through a vibrometrytest.

The study warns that it may take many years before the damage becomes apparent, and that there is a need for an information campaign about the condition. One group that is probably unaware of white finger is the large number of students attending auto-mechanic courses around the country.



**Source:** Christer Hansson, *Arbetsmiljö* 5/92 p28; Hans-Olof Wiklund, *Arbetarskydd* 5/1992 p15; Annette Jörgensen, *Arbetarskydd* 5/1992 p7

## EuroDisney goofs on work environment



Work on the new EuroDisney funpark outside Paris is not a lot of laughs - at least judging by the staff turnover. 3,000 out of the 16,000 employees are said to have fled the funpark due to low wages and poor working conditions. This is denied by the park management, lowering the figure to one thousand - half being voluntary retrenchments.



**Source:** *Arbetarskydd* 9/1992, p7 (from Wall Street Journal)



# Airy concerns

## Contaminated breathing air may be harmful

*The breathing air supplied to full face masks is often contaminated by oil, bacteria and gases. Danish research shows great concern about workers contracting serious lung disease, even lung cancer, through supplied air.*

Full face masks may be connected to a dedicated breathing air network, or a system that supplies both breathing air and operating air for compressed air tools. In both cases, the supplied air may be contaminated by oil and other pollutants.

The problems with contaminated breathing air were pointed out more than ten years ago. The most common complaints include respiratory infections, allergic reactions, headache and irritation to mucous membranes.

Danish research suggests that, since mineral oils may cause skin cancer, the lungs may also be affected by breathing air containing oils.

The concentration of oil in breathing air is usually very low — below the official limits. However, the oil can be eliminated through the use of appropriate compressed air filters attached to the compressor.

Oil-free compressors produce less oil than conventional machines. Oiled compressors should be fitted with cleaning stations that sort out coarse droplets as well as fine oil mist.

The filters should be replaced regularly. The survey found several instances where the filters were so contaminated that they actually added to the pollutants in the system.



Source: Nora Weintraub, Arbetarskydd 4/1992 p15

## CHEMICAL FACTS:

# Acetone

- Other names:** 2-propanone, Dimethyl ketone, Ketone propane
- Characteristics:** Colourless liquid. Very volatile.
- Odour:** Fragrant, sweet, mint-like smell.
- Smell level:** 200-450 ppm
- Aust. TWA:** 500 ppm
- Solubility:** 100% water soluble
- Fire:** Very flammable. May form explosive mix with air even at room temperature. Soiled clothing becomes a fire hazard.
- Inhalation:** Nausea, dizziness, headache. At very high concentrations, loss of consciousness.
- Skin contact:** De-greases the skin, causing cracks, Contact eczema possible after long term, repeated exposure.
- Eye splashes:** Severe pain.
- Ingestion:** Same symptoms as for inhalation.
- Prevention:** Ensure good ventilation. Floor exhaust. Vapour gathers at the floor level. Keep containers closed. Avoid direct contact with the material. Keep an eye rinse station on the premises. Avoid smoking, fire, sparks. Eliminate all sources of static electricity. Electrical tools and appliances should be insulated and intrinsically safe.
- Other:** May react violently with some oxidising materials and with chloroform. May damage packaging, painted and varnished surfaces, natural rubber, and some synthetic materials, such as spectacle rims.



Source: Swed. Worksafe Directorate, Skyddsblad #23; NI-OSH Guide to Chemical Hazards

# SOLVENTS — THE

*do you know*

## Brain and nerves

The nervous system may sustain damages resulting in serious psychological disturbances.

## Heart and blood

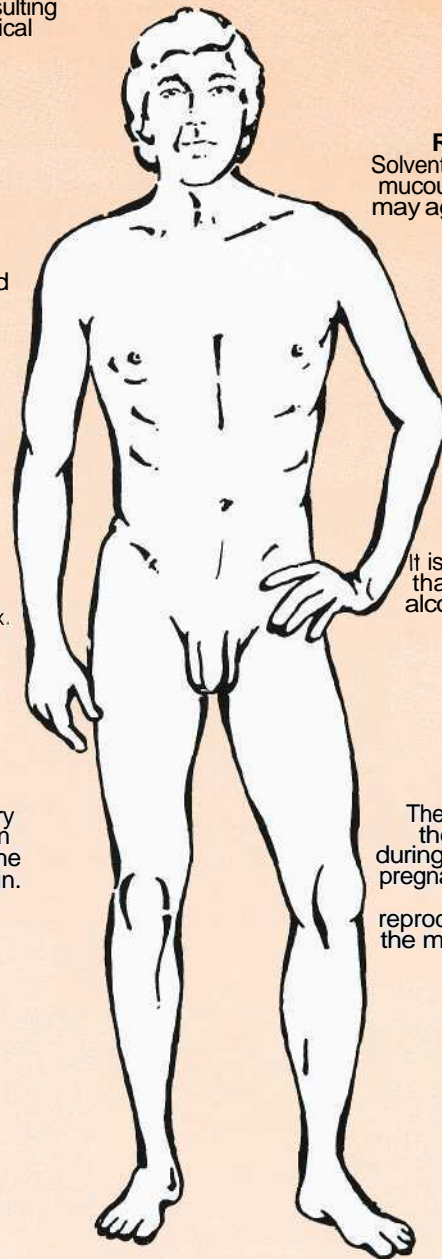
Several chemical substances may be harmful, e.g. to blood formation.

## Kidneys

Evidence shows alterations in the way the kidneys work.

## Skin

The skin becomes dry and sensitive. Certain solvents may enter the body through the skin.



## Eyes

Eye irritation is common.

## Respiratory tracts

Solvents cause irritation to mucous membranes and may aggravate bronchial conditions.

## Liver

It is strongly suspected that a combination of alcohol and solvents is highly dangerous.

## Reproduction

The risks of damage to the embryo are great during the early stages of pregnancy. Moreover, it is suspected that reproductive cells in both the male and the female may be affected.

## BRAIN AND NERVE CELLS

The most serious health risks in connection with the use of solvents are related to the brain.

The symptoms are difficult to detect, as they may also occur in people who have never been in contact with solvents.

The most important signs of damage are memory deterioration, emotional personality changes and, at a later stage, intellectual regression. Further signs include fatigue, poor concentration, headaches, sweating, poor sexual performance — in short, a general worsening of the psychological well-being.

Typical examples of how the damage may pronounce itself are: forgetting where you parked the car, inability to remember three shopping items, forgetting what tools to take to a job on location, poor recall of important addresses repeatedly checking the doors are locked and the stove is off, oversensitive and irritable behaviour.



## HEART, BLOOD VESSELS AND BLOOD FORMATION

These areas are affected to a somewhat lesser extent than the brain. A dramatic increase in chronic heart disease has been observed in cases of



# THE HEALTH RISKS

*the dangers?*

Exposure to high concentrations of carbon sulphide ( $CS_2$ ).

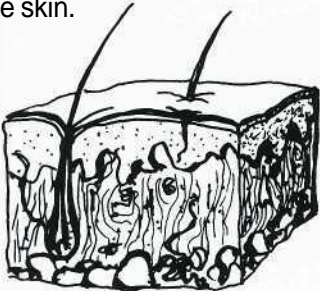
The bone marrow, where the blood corpuscles are produced, can also be affected by solvents. This should be of concern even in the home, where children and adolescents often come in contact with hobby glues and paints.



## SKIN

Solvents dry out the skin. The skin's protective coating of fat is dissolved, increasing the risk of penetration by substances which may cause further damage. Irritation and rashes are early signs.

The affected area becomes itchy, often flaking and smarting. Once the damage is sustained, other substances, like hot water, also hurt. The risk of eczema increases. In the past, allergic reactions were common amongst those who worked with turpentine. Most modern solvents, however, cause irritation by drying out the skin.

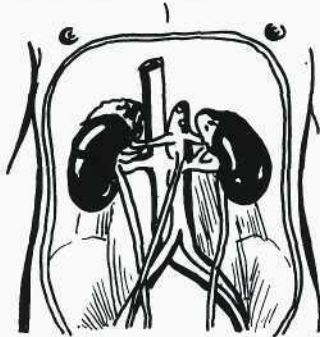


## LIVER

Enlargement of the liver is an insidious process whose symptoms are difficult to detect. Damage to the liver through solvents is believed to be rare. However, greater susceptibility to the effects of alcohol may point towards a dangerous combination of alcohol and solvents.

## KIDNEYS

Chronic inflammation of the kidneys will give no early warning signs. There is no sudden deterioration, and the disease is usually detected through routine health checks. In many cases, the doctor has been consulted for swelling of the legs, fatigue, headaches, or other ailments.



## RESPIRATION

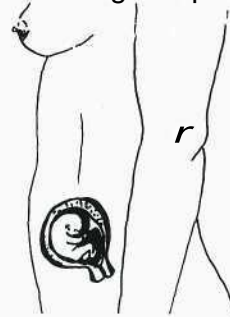
Solvents irritate mucous membranes in the respiratory tract. The throat becomes sensitive, and an affected person may cough or experience difficulties in breathing, especially if he has a history of lung ailments, e.g. through smoking or bronchitis.

## EYES

Contact with solvents may often result in eye irritation.

## BIRTH DEFECTS

A number of solvents are suspected to cause genetic damage. Solvents may also be linked with miscarriages and still births. Brain disorders in children have been recorded in cases where the mother has been subjected to solvents during her pregnancy.



## TUMOURS

Certain solvents have been labelled as carcinogenes. The use of these particular substances is prohibited or restricted. This area has not been fully explored, and further research is underway. It seems, however, that the cancer risk is not significantly greater for people who are handling solvents than for any other group.

\* \* \*





# Women more likely to have hand eczema



*Hand eczema is about twice as common in women as in men, according to new research. We look at the possible explanations.*

Hand eczema is the most common occupational skin disease, and is one of the most common reasons for visiting the doctor for skin conditions. A new survey asked a large group of people—20,000 randomly selected workers—whether they had suffered from skin complaints in the past 12 months. Over 2,000 people were subsequently interviewed about their problems, and called to a medical examination.

## What is eczema?

Eczema is a skin inflammation, which may manifest itself as itchy skin, blistering, or dry flaking and peeling of the skin. Eczema is caused by allergic reactions, or by excessive wear and irritation of the skin.

The most common type of hand eczema is non-allergic contact eczema. This is also the type that is most closely related to occupationally acquired skin disease.



## Contributing factors

If you had eczema during your childhood, you are more likely to contract it again at work. Women are twice as likely as men to have the condition. Exposure to water and wetness in your work is also a contributing factor, as are asthma and hay fever.

Many people in the service trade are exposed to water, detergents, dust and dirt. These substances wear out the skin, which becomes brittle and more susceptible to bacteria and hazardous substances. It is not surprising that workers in the service trades are more vulnerable to hand eczema.

Age also plays a part in the occurrence of hand eczema. Younger women are more affected than others, and if you have children under 15, the risk is even greater. One possible explanation is that women with younger children also perform more "wet" work, such as cleaning and washing, at home.

In the service trades, cleaners are the most affected: one worker in every five suffers from hand eczema, regardless of sex.

## Allergic contact eczema

The most common cause of allergic hand eczema is exposure to nickel, cobalt, perfume mixes, or cinchona (Peruvian bark).

Many people are forced to change their jobs because of hand eczema. Hairdressers are often affected, with about 18% having to

depart from the trade due to eczema (see article in PPM 4/91).

## Lowering the risks

It is important to learn about eczema, about the risk of eczema in your profession, and about protective measures—especially if you had eczema in your childhood (atopic eczema).

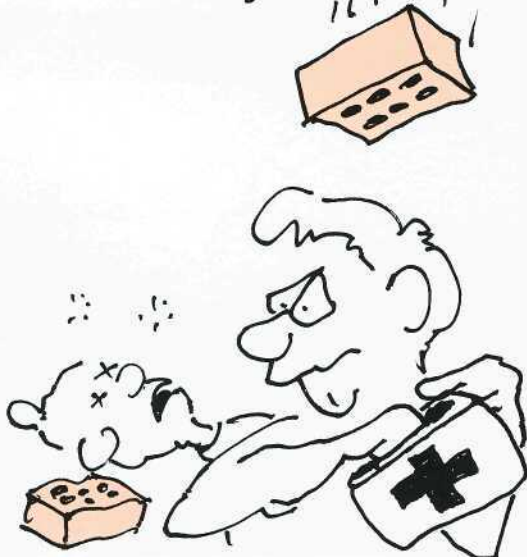
Some risk occupations include:

- Hairdresser
- Dental nurse
- Medical nurse
- Kitchen hand
- Cleaner
- Auto-mechanic
- Factory worker



**Source:** Nora Weintraub, Arbetarskydd 13/91 p6 (from Birgitta Medling's survey "Hand Eczema", Swedish Work Environment Institute science series Work & Health 1991:28).

## Handy Hints



**What's the FIRST in First Aid?**

**FIRST check whether the danger that caused the accident is still there before you even start.**

## CHEMICAL FACTS:

# Phenol

**Other names:** Hydroxybenzene, Monohydroxy benzene, Carboic acid

**Characteristics:** Colourless to pink solid or thick liquid

**Odour:** Sweet, tarry smell

**Smell level:** About 0.3 ppm

**Aust. TWA:** 5 ppm

**Solubility:** 8% soluble in water

**Fire:** Creates explosive air mix when heated

**Inhalation:** Soreness in nose and mouth; headache, dizziness, nausea. High concentrations: impaired breathing, lung oedema, loss of consciousness. Liver and kidney damage.

**Skin contact:** Severe damage with sores that are hard to heal. Initial pain, followed by whitening of the skin and diminished sense of touch. Water solutions penetrate the skin quicker than undiluted phenol. If the skin isn't cleaned immediately, skin absorption occurs, followed by shock, cramps, impaired breathing, liver and kidney damage, and loss of consciousness.

**Eye splashes:** Severe pain. Swollen eyelids, Permanent corrosive eye damage.

**Ingestion:** Grave corrosive damage. Severe mouth, throat and stomach pain. Vomiting, shock, asphyxia and loss of consciousness.

**PREVENTION:** Use enclosed systems if possible. Otherwise, mechanical ventilation and local exhaust are required. Emergency showers and eye rinse stations should be available. Keep a supply of polyethylene 400, and prepare a 30% solution of polyethylene for eye rinsing. Avoid fire, sparks and welding.



**Source:** Swedish Work Safe Directorate, Skyddsblad #38; NIOSH Guide to Chemical Hazards

# Can you handle eczema?

*Rubber gloves can cause eczema and rashes. People with other types of allergies are more likely to develop rubber allergy, according to a recent survey.*

Preliminary studies show that about 2 per cent of people develop rashes and other skin problems from rubber gloves.

The use of rubber gloves has been increasing steadily, and so has the incidence of rubber allergies. For example, dentists and hospital personnel are using gloves to a much greater extent, in order to protect themselves against hepatitis and AIDS.

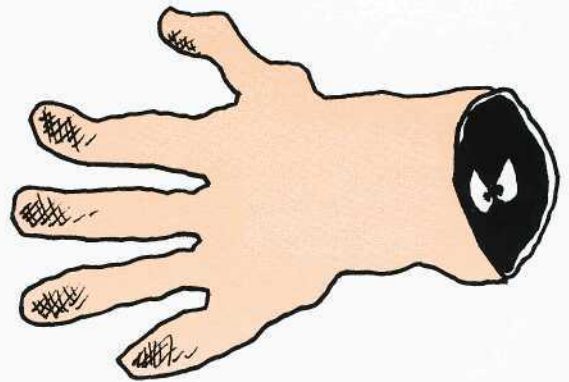
Sensitivity to rubber manifests itself in several ways. This study comprised 233 people. About a third (81 people) complained of skin irritation. Most suffered from mild skin irritation. There were over 20 cases of eczema, and four people experienced hives.

Contact eczema is caused by an allergic reaction to certain chemicals in the rubber. Within a few days, skin areas that have been in contact with gloves, face masks, finger protectors and other rubber products begin to show irritation. The eczema is fiercely itchy.

Rashes may occur after only a few minutes' exposure to rubber. The reaction is probably due to an allergy to certain natural juices from the rubber tree — not to chemical substances in the rubber.

The study concluded that the talcum powder in the gloves did probably not play part in the allergic condition.

The reactions to the rubber-tree juices vary in severity. Most people experience slight, temporary irritation. Some suffer a much stronger reaction, causing hay fever, itching all over the body, or asthma. Fewer still may display a drop in the blood pressure and allergic shock.



People who are very sensitive should make sure that hospital personnel do not wear rubber gloves when treating them.

Plastic gloves are a possible option for those allergic to rubber, if they need to wear protection in their work.

Another alternative is to wear a plastic or cotton glove underneath the rubber glove.

In any case, hand hygiene is extremely important. Also, keep hands as dry as possible.



**Source:** Pernille Keil, Forskning Pagar (Notes from Doctors' Conference, Sweden 1991. Study conducted by Karin Wrangsjö, occupational dermatology clinic, Karolinska hospital, Stockholm.)

## Handy Hints



**YOUR EARS ARE POPPIN'!**

*Ear plugs may slowly loosen, dislodge, and fall out. Check once in a while that they're still securely fitted.*



# DISK-JOCKEY GETS AN EARFUL

*An article in the Swedish magazine Arbetarskydd outlines the life of a disk jockey in a restaurant, who after ten year's work left his job with a life-long hearing impairment, caused by a wrongly placed loudspeaker.*

After ten years as a disk jockey, Christoph Comstedt suffers from hearing impairment and continuous hissing in his right ear.

The damage was caused by a loudspeaker that was directed towards the DJ's booth instead of towards the dance floor. Although the DJs were consulted in the design of the restaurant, the loudspeaker was placed in the offending position.

In mid-1990, Christoph was officially diagnosed as hearing impaired in a routine audiometric test.

Safety engineers visited the restaurant and measured a sound level of 99.8 decibel in the DJ's booth (almost 32 times greater than the Swedish acceptable level of 85 dB).

The loudspeaker has since been turned, and the booth is to be redesigned.

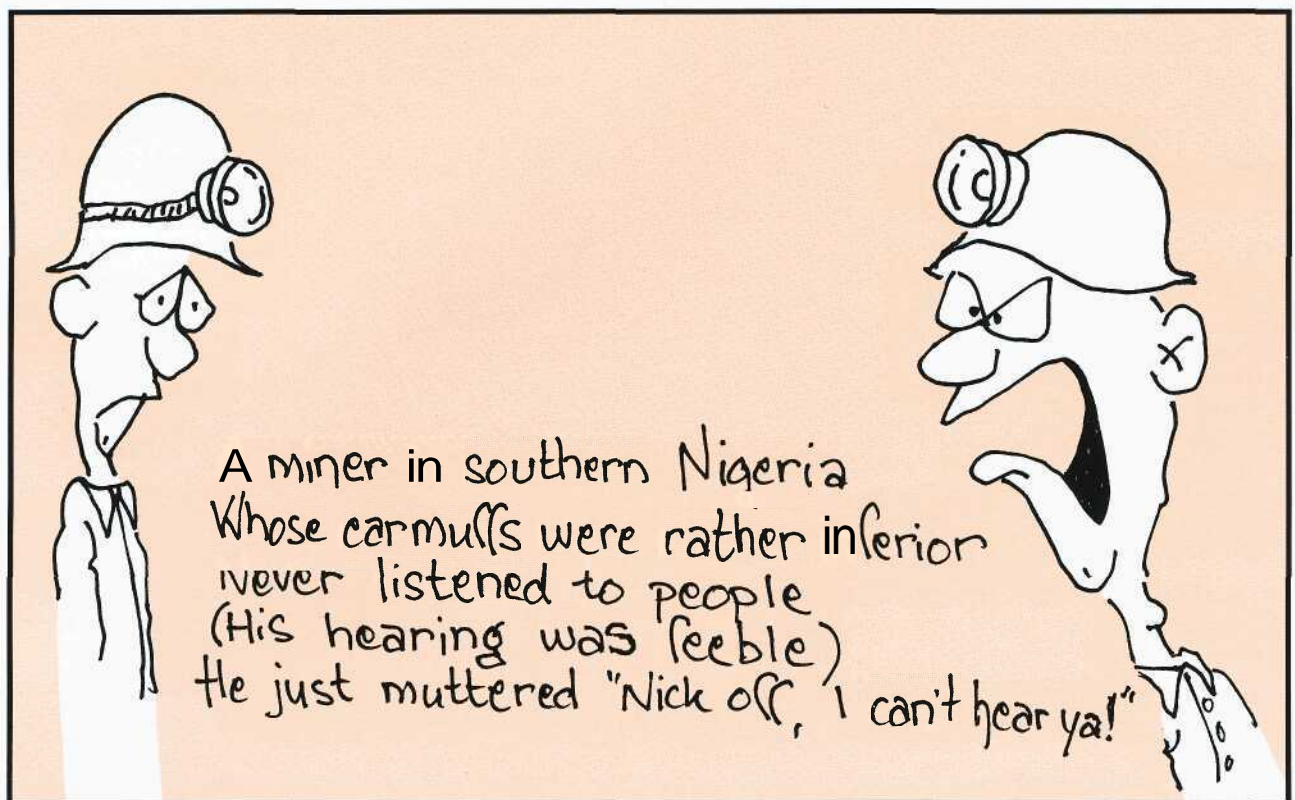
Initial suggestions to lower the volume were resisted by the restaurant, due to customer pressure. Hearing protection was similarly seen as a poor solution, since customers often came up to the disc jockey to ask questions about the music or place requests for songs.

In an unprecedented move in the music world, Christoph Comstedt lodged a occupational damage claim against the restaurant. The restaurateur denies that the damage has been sustained as a result of occupational noise. The matter will be resolved at a future time.

(See also article on Australian youth and hearing damage from music).



Source: Marie Närlid, Arbetarskydd 12/1991, p20



# COMPETITION WINNERS

*In the Christmas 1991 issue of PPM, we presented a "find the faults" competition, in which readers were invited to send in their suggestions for improving the illustrated situation below.*

It was pleasing to see that most entrants picked most of the mistakes. However, some were more thorough than the rest.

The prizes, class S.E.A. T-shirts go to the following five sharp-eyed winners:

- **Amanda Basten, Safety & Health Coordinator, ICI Australia, Villawood NSW**
- **John Bridge, Safety Officer, Philip Morris Ltd, Moorabbin VIC**
- **Frank Horky, Safety Officer, Sydney Harbour Tunnel Joint Venture, North Sydney NSW**
- **D. J. Paff, Personnel Officer, Lansdowne Engineering, Taree NSW**

- **Kay Turner, Safety Trainer, APM Containers, Brooklyn VIC**

## What you missed:

The most common safety hazards that readers went past were:

- **Damaged label on the bucket**
- **Stubble on the chin (poor respirator seal)**
- **Worker is likely to knock down bottles when using spanner**
- **Electric cords running across floor (trip hazard)**
- **Naked lightbulb**
- **Fire extinguisher location blocked by boxes**
- **Only using one hand**  
And finally, only ONE reader (John Bridge) picked that:
- **Putting a gloved hand in the pocket may contaminate clothing.**

Our cartoonist decided not to take to heart the many entries that used words like **disgusting, revolting and appalling** to describe the drawing.

We thank all entrants for their efforts, and look forward to another competition towards the end of this year.





# Stand and fall with your respirator

*Wearing a respirator lets you stay on your feet as far as health goes — but it's not a fall-proof solution.*

A team of researchers in Cincinnati have found that wearing a respirator will not only protect you from harmful substances: it may also increase the risk of slips, trips and falls in the work place.

You are probably familiar with the feeling: after performing moderate to hard physical work, your body tends to sway. After really hard work, you might find it hard to even stand up, and you have to sit down until you catch your breath.

This is not just a subjective feeling: muscular fatigue in combination with general fatigue could cause a temporary disturbance in the central nervous system (CNS) and the peripheral nervous system (nerves in your legs, back etc.).

The result is that your ability to keep your balance is diminished; your brain finds it harder to stay perfectly upright.

## Respirator adds to the load

It is well-known fact that putting a respirator on your face places extra strain on your body: you breathe quicker, you feel hotter, your heart rate rises, your blood pressure increases.

If your work is relatively strenuous, and if you have to wear a respirator, you may run a higher risk of falling or slipping or otherwise have an accident due to losing your balance.

Apart from adding to the heat stress and physical strain on the body, a respirator may also affect your field of vision. This can be particularly hazardous if you're climbing ladders or stairs, or performing other jobs that require good balance and vision.

In other words, falls are a leading type of accidents in the work place, and respirator wear may contribute to the risk of falling.



## Standing up — a complex task

Standing upright may seem a simple, natural procedure. In fact, it requires continual input from several sensory systems:

- Sensory nerves in your legs
- Pressure-sensitive nerves in the soles of your feet
- The vestibular (balance) nerves in your ears
- Visual information from your eyes

Numerous muscles must be coordinated every moment in order to keep your body upright. Fatigue may make the nerves, brain and muscles slower or less efficient in sensing and correcting any sway.

## The effect of a respirator on your balance

Everybody sways slightly when standing up — even at complete rest without a respirator. The sway is significantly increased after performing physical work. If you're wearing a respirator, the sway becomes even more pronounced.

## The importance of mask fit testing

Individual respirator fit testing is important for a number of reasons. One lesser known reason is that the supervisor also has the oppor-

tunity to detect any potential balancing problems in the user when wearing a respirator.

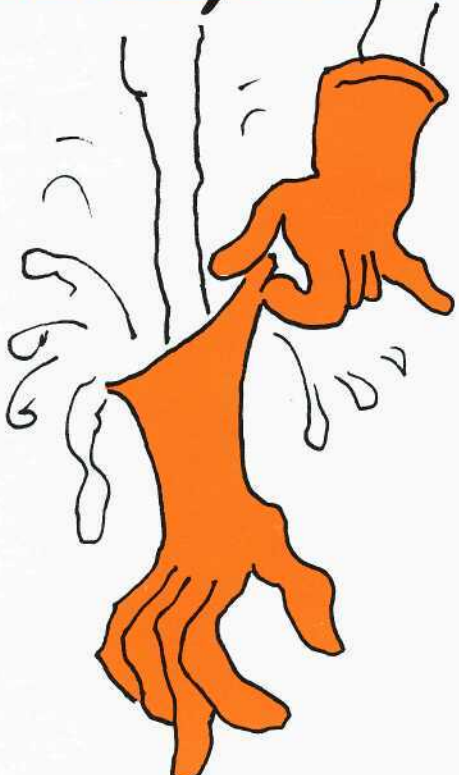
The results of the study suggest two important factors in fall prevention among respirator users:

- **Maintain optimal work levels in order to minimise imbalance caused by fatigue**
- **Select respirators that give as wide a field of vision as possible (especially important in full face masks).**



**Source:** Seliga, Bhattacharya, Succop, Wickstrom, Smith, Willeke; Effect of work load and respirator wear on postural stability, heart rate, and perceived exertion; American Industrial Hygiene Association Journal, number 52, Oct 1991.

## Handy Hints



**I GLOVE YOU!**  
*Always wash and dry your hands before putting on gloves*

# TermTime!

*Here are a few of the most common descriptions of air contaminants and their effects on your body. Learn them, and recognise them on labels, descriptions and Materials Safety Data Sheets:*

- Irritant** Irritates the respiratory system. Usually corrosive. Example: chlorine.
- Asphyxiant** Reduces the amount of oxygen available to your body. Works in one of two ways: either inhibits your body's ability to absorb oxygen (example: carbon monoxide), or by replacing the oxygen content in the surrounding air (examples: carbon dioxide, methane, helium).
- Anaesthetic** Chemical that causes you to feel drowsy or lose consciousness
- Carcinogen** Substance that causes cancer. May either cause cancer on its own, or act as a "trigger" for other cancer-inducing substances.
- Mutagen** Substance that alters the genetic materials in your body cells. May cause damage to the reproductive cells (sperm and eggs), which could result in birth defects etc. In other types of cells, it may cause cancer.
- Teratogen** Causes malformations in the unborn baby. The younger the foetus, the greater the risk. Well-known example: thalidomide.
- Systemic poison** Substance that affect various organs in the body.
- Sensitising substance** Causes allergic reaction. Once your body has been sensitised to the substance, it could only take a very small amount to cause a strong reaction. Examples: isocyanates, sulphur dioxide, grain dust, flour dust.



**Source:** Nat Occ Health & Safety Commission; Atmospheric Contaminants, Dec 1989 (Worksafe Australia Guide).

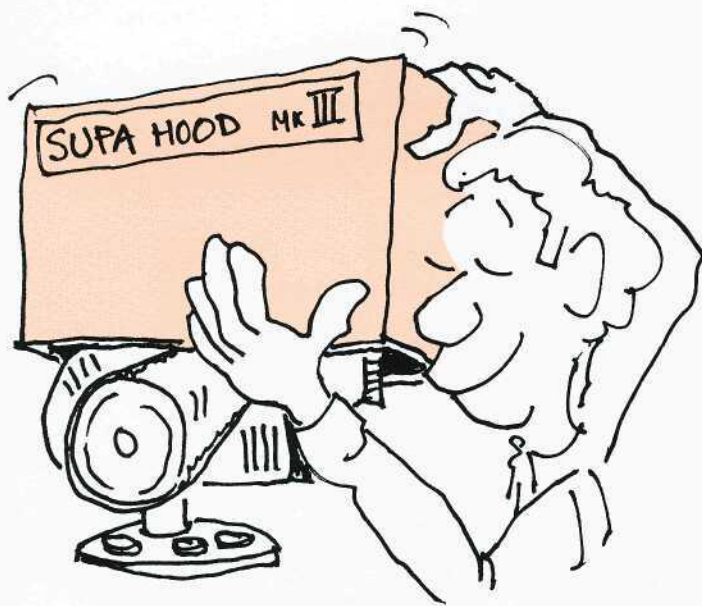


# "Engineering-out"

— what does it mean?

*Many safety articles, including those in PPM, urge you to "engineer-out" any hazards before resorting to personal protection, such as ear muffs and respirators. But what does it really mean? What can actually be done at the source end of the hazard?*

Here is a brief checklist of measures that could be taken. Unfortunately, these measures are commonly not practicable, or even possible.



## Elimination

Get rid of the hazard altogether.

### Chemicals

- Is the substance really necessary in the operation? If not, get rid of it.

### Noise

- Can the noise source be eliminated?



## Substitution

Replace the hazard with a less hazardous one.

### Chemicals

- Could another, less hazardous, chemical be used instead? (For instance, using water-based cleaners in place of solvents).
- Is a powdered chemical also available as granules that don't cause as much dust?

### Noise

- Can noisy machinery be replaced with more quiet appliances?



## Engineering

A safer workplace can sometimes be achieved by modifying existing plant and premises.

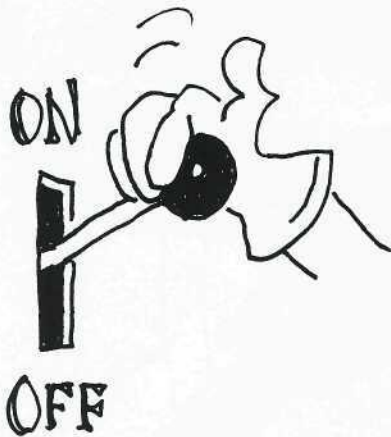
### Chemicals

- Can chemical handling be mechanised or automated?
- Can the flow of chemicals be enclosed or pumped through pipes?

- Can local exhaust be installed at the point of origin of the contamination?
- Can general ventilation on the premises be improved?
- Can dust-producing work be performed in a wet environment?

### Noise

- Can the machinery be sound-proofed or insulated?
- Can noise and vibration be reduced by placing the appliance on a soft, absorptive surface?
- Can the noise source be repositioned in another room or part of the building?
- Can you build a hood or shield around the noise source?



### Workpractices

Sometimes, hazards can be avoided through sensible work practices — sometimes through sheer practical thinking.

#### Chemicals

- Keep containers closed.
- Store chemicals away from the workplace.
- Don't stand near dust-producing areas if you can avoid it.
- Keep away from vapours, gases and fumes if you can.

- Can the work be performed in the open? (However, this is rarely a feasible solution).

### Noise

- Don't stand near noisy machinery if you can avoid it.
- Shut off machines if they are not needed.
- If possible, move portable equipment to another room or behind a corner.
- Try to place something solid between you and the noise source.
- Don't place noisy equipment in the corner of a room — this might amplify the noise.



**Source:** (Among other sources:) National Occupational Health and Safety Commission; Atmospheric Contaminants, Dec 1989 (Worksafe Australia Guide).

## Handy Hints



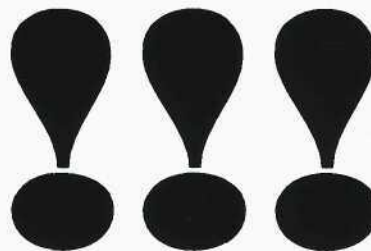
*Keep all electrical cords,  
water hoses and com-  
pressed air lines  
**OUT OF THE WAY!***



# BET YOU DIDN'T KNOW...

*The body we protect through personal protection is on an astounding array of physiological marvels. Here are just some of the things you might not know about your body:*

- The body comprises 24 elements. Out of these, hydrogen and oxygen make up 88.5 per cent.
- Your fingertips are so sensitive, they can detect vibration with a movement of 0.02 of a micron.
- Normal biting strength is over 70 kg. Some people have recorded over 400 kg biting strength. Ouch!
- The human eye can detect an object with a diameter of only **100** microns at a distance of 25 cm. (A micron is one thousandth of a millimeter).
- The eye can distinguish over 10 million colours. Great fun for interior decorators.
- A newborn child has 300 bones in its body. Adults have only 206 bones. Do we drop them as we grow up? No, many bones fuse together during growth.
- The longest bone is the thigh bone. The smallest bone is the stirrup bone in the ear — about as long as this line: -
- There are 639 muscles in the body. The biggest is the buttock muscle, the smallest is attached to the stirrup **bone**, and is as big as a fingernail.
- Your brain weighs about **1.4** kilograms (3 lbs).
- Your skin, laid out flat, measures about two square metres, and weighs about twelve kilograms in an adult.
- You sweat up to 2 litres per day.
- A square the size of a stamp on the back of your hand contains:
  - 3 metres of blood vessels*
  - 30 hair follicles*
  - 300 sweat glands*
  - 600 pain sensors*
  - 6 cold sensors*
  - 36 heat sensors*
  - 75 pressure sensors*
  - 9,000 nerve endings*
  - 12 metres of nerves*
  - 4 oil glands*
- Your blood contains about 55% **liquid** and 45% solids
- You have about 25 trillion red blood cells. Lined up end to end, they would form a string that could be wrapped 3 times around the world.
- Your body contains more than 60 billion blood vessels ranging from 2.5 cm in diameter to a hundredth of a millimeter.
- Some people have 26 bones in each foot, some 28. Have you counted yours?
- The foot sole has more sweat glands and more pressure-sensitive nerves than any other part of your body.



Source: Wallechinsky & Wallace, *The People's Almanac*;  
The Guinness Book of Records 1989

# Hot advice:

*In Australia, it is quite common to work in hot conditions, even if your work doesn't involve any particular heat sources. The effect of heat on the body can cause several serious disorders.*

## Heat rash

Known as "prickly heat". Numerous blisters on the skin appear, along with severe itching. Caused by the skin clogging up due to constant perspiration. Not dangerous in itself, but repeated scratching and rubbing may result in irritation and pustules.

## Heat cramps

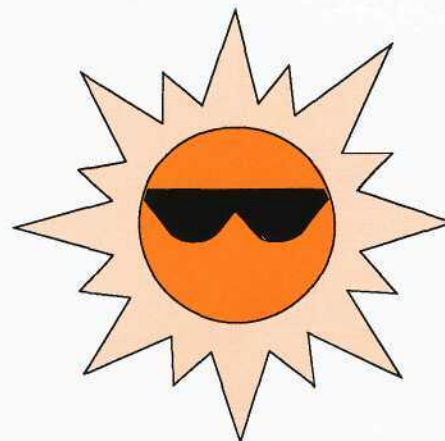
Painful cramps due to loss of salt. May occur in foundry workers, stokers etc. Salt is only one of the many minerals lost by excessive sweating. Usually, enough salt is replaced through normal diet, but certain jobs may require continuous replacement of salt through salt tablets or salty water. It is important to keep drinking liquid throughout the day if you work in a hot area.

## Heat stroke

This is the most serious condition caused by heat, and could result in death. Heat stroke means that the body's cooling system breaks down.

Early symptoms of heat stroke include fatigue, giddiness, slight fainting, urine in small amounts and of dense colour.

Keep replenishing your body's need for liquid. Slake your thirst, then drink a bit more still. Drink regularly, whether you're thirsty or not.



Watch out for warning signs. These include:

- Dilation of blood vessels in the skin
- Sweating
- Reduced activity
- Decreased muscle tone
- Decrease in urine
- Thirst
- Heat cramps
- Dizziness, nausea
- Rising body temperature
- Collapse

If any symptoms occur, keep the person as cool as possible (cool bath, blanket soaked in cold water etc.), give saline water to drink (if conscious) and call for help.



Source: Black's Medical Dictionary

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