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IMPORTANT

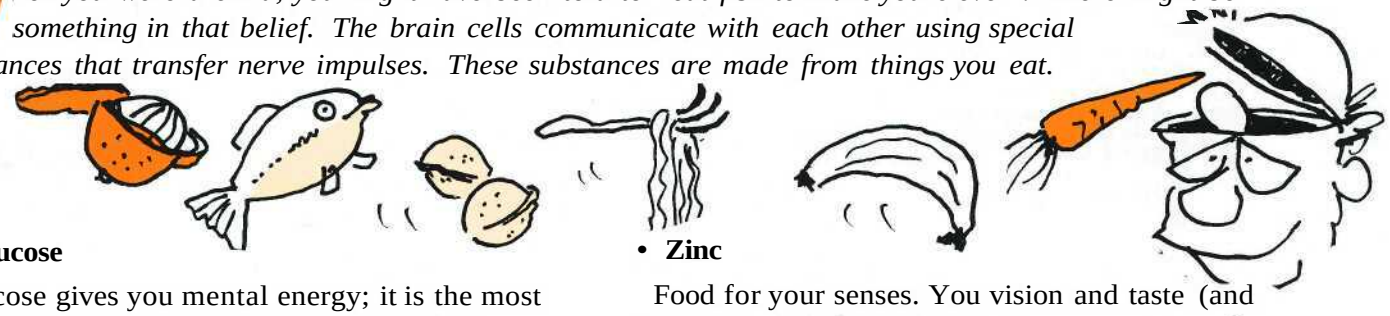
professional protection magazine

Published by Safety Equipment Australia Pty Ltd A.C.N. 002 727 586 in the interest of industrial safety in Australia. ISSN 1031-7996

Volume 10 number 36/37, Dec 1995——Print Post Approved PP255003/01482

Brainfood
Food that makes you smarter

When you were a child, you might have been told to "eat fish to make you clever". There might be something in that belief. The brain cells communicate with each other using special substances that transfer nerve impulses. These substances are made from things you eat.



- **Glucose**

Glucose gives you mental energy; it is the most important fuel in the brain. It is formed by breaking down carbohydrates, which are present in the following foods:

—***Bread***, *unpolished rice, pasta, bananas, orange juice, grapes, apples, carrots, honey*

- **Amino acids**

Amino acids benefit the brain chemistry. They are found in:

—***Nuts***, *soy beans, beef, chicken, fish, egg, milk.*

- **Folic acid**

A kind of vitamin-B, which is good for your general well-being. A lack of vitamin B can cause fatigue, "feeling down", problems with muscle coordination.

—***Yeast***, *beef liver, spinach, broccoli, beetroots, orange juice, wholemeal.*

- **Choline**

Good for your memory, according to research from the Massachusetts Institute of Technology.

—***Beef*** *liver, unpolished rice, soya beans,* eggs.

- **Zinc**

Food for your senses. You vision and taste (and your appetite) depend on zinc.

—***Shellfish,*** *fish, meat, liver, eggs.*

- **Iron**

For your memory. Lack of iron makes oxygen lowers the oxygen uptake in the body. Together with zinc and choline, iron can contribute to better memory.

—***Beef*** *liver, beef, poultry, soy beans, peas, broccoli, plums.*

- **Boron**

To perk you up.

—***Apples***, *broccoli, cabbage, cauliflower.*

- **Vitamin B6**

—***Liver***, *some fish, lean meat, unpolished rice, lentils, nuts, bananas, potatoes.*

Source: *Kroppen!*, 1995, 'Smartmat', number 1, p 7, supplement to Arbetsmiljö

Question & Answer

Q Any update on the findings regarding memory disturbances in aluminium welders?

Daryl Daley, Narangba QLD

A We have received a study from late 1994, conducted by the Swedish National Institute of Occupational Health. The study concerns the effects of aluminium and manganese welding on the nervous system. However, it does not concern itself particularly with memory disturbances.

The study was made on a relatively small number of welders:

- **38 welders exposed to aluminium**
- **12 welders exposed to manganese**
- **39 welders exposed to iron (as a reference group)**

The survey was compiled through a comprehensive questionnaire, as well as urine and blood sampling.

Both aluminium and manganese welders showed symptoms of effects on the central nervous system — aluminium welders more so than manganese welders. The median exposure to aluminium was just over 7,000 hours. Manganese welders had a median exposure of 270 hours. The aluminium welders had at least 7 times more aluminium in their urine than the reference (iron) group, while the manganese welders showed no increase of manganese.

Both aluminium and manganese welders showed decreased motor function.

Other tests have found difficulties in concentration, coordination, memory degradation, lessened capacity to grasp abstract concepts, and unprovoked depression in aluminium welders. However, such symptoms were not found in this particular study to any significant extent.

The main finding in this study was a decrease in motor function in the welders. The problems were dose-related, i.e. they increased with the exposure to aluminium. The research group recommends urgent action to lower welders' exposure to aluminium.

In the case of manganese welders, the group recommends that those working with high-alloy manganese electrodes need to improve their work environment.

Source: Sjögren B., Iregren A., Freeh W., Hagman M., Johansson L., Tesarz M., Wennberg A., 1994, 'Påverkan pa nervsystemet hos svetsare exponerade for aluminium eller mangan', *Arbete och Hälsa*, number 27, National Institute of Occupational Health, Solna, Sweden

Eco-farmers in false security

Allergies and eczema are more common among so-called eco-farmers or organic growers than among farmers who use chemical pesticides.

This is the conclusion a new survey from the clinic of occupational and environment medicine in Huddinge, Sweden.

However, it is not the natural pesticides that are responsible for the health complaints. The explanation is that the eco-farmers believe that their "clean" pesticides are less dangerous, and consequently fail to wear protective clothing.

Farmers using chemicals know about the risks, and are therefore more anxious to protect themselves, according to the study.

Source: *Arbetsmiljö* 1995; 'Även eko-odlare bör ha skyddskläder'; number 6, p 9

A balanced report

Solvents can ruin your balance

Whether you lie flat on your back or walk a tightrope, your sense of balance is hard at work, governing the position of your body, adjusting your muscles, determining your movements.

You might have learnt in school that the balance organ sits in the inner ear. It does, but that is only part of the story. The balance organ, comprising three semicircular loops, tells the brain how the head is tilted... but there is more to it than that. The sense of balance depends on a complex cooperation between the balance organ, vision, the sense of touch in the skin, and a continuous flow of information from muscles and joints.

The **balance organ** in the ear is partly filled with a liquid. Its interior walls are covered with nerve cells that report to the brain whether they are covered by liquid or not. In a very simplified way, each nerve of your balance organ works like the petrol gauge in your car; you might have noticed that the gauge shows different levels if the car is on a slope as opposed to flat ground.

The balance organ can determine any head position — even if you are hanging upside-down on a circus trapeze. It is extremely fast; it reports not only the position of your head, but also the speed at which any change in position occurs. However, the balance organ cannot detect constant speed.

Vision plays an important role in staying on your feet. Your eyes keep track of the horizon (or other stationary points in your surroundings), and add to the overall balance information received by the brain. It is easy to experience the importance of vision: try to stand up and shake or nod your head vigorously, or spin around in a pirouette, or dance with your eyes closed.

Muscles, skin and joints are also important. Sense organs send continuous nerve impulses to the brain, telling it about your posture, the position of your arms and legs, and the load on your feet. Just shifting your weight from one foot to the other involves a host of signals to the brain in order to maintain your balance.

Staying on your feet involves a number of brain functions at various levels in the central nervous system. The brain stem, cerebellum,

thalamus, cerebral cortex and diencephalon are all involved in the balance system. The cerebellum could be seen as the main manager: it is here that our movements are governed, so that all our body motions are well adjusted and at the proper speed.

But the cerebellum is also one of the most vulnerable parts of the balance system.

Solvents and balance

If the cerebellum is damaged, for example by solvents or heavy metals, the result can be jerky eye movements, fuzzy vision, dizziness and loss of balance.

People whose cerebellum has been danraged by solvents can "fall like a tree", because they have lost the protective reflexes that normally break their fall.

Solvent-induced nerve damage occurs in three stages: Acute, sub-chronic and chronic.

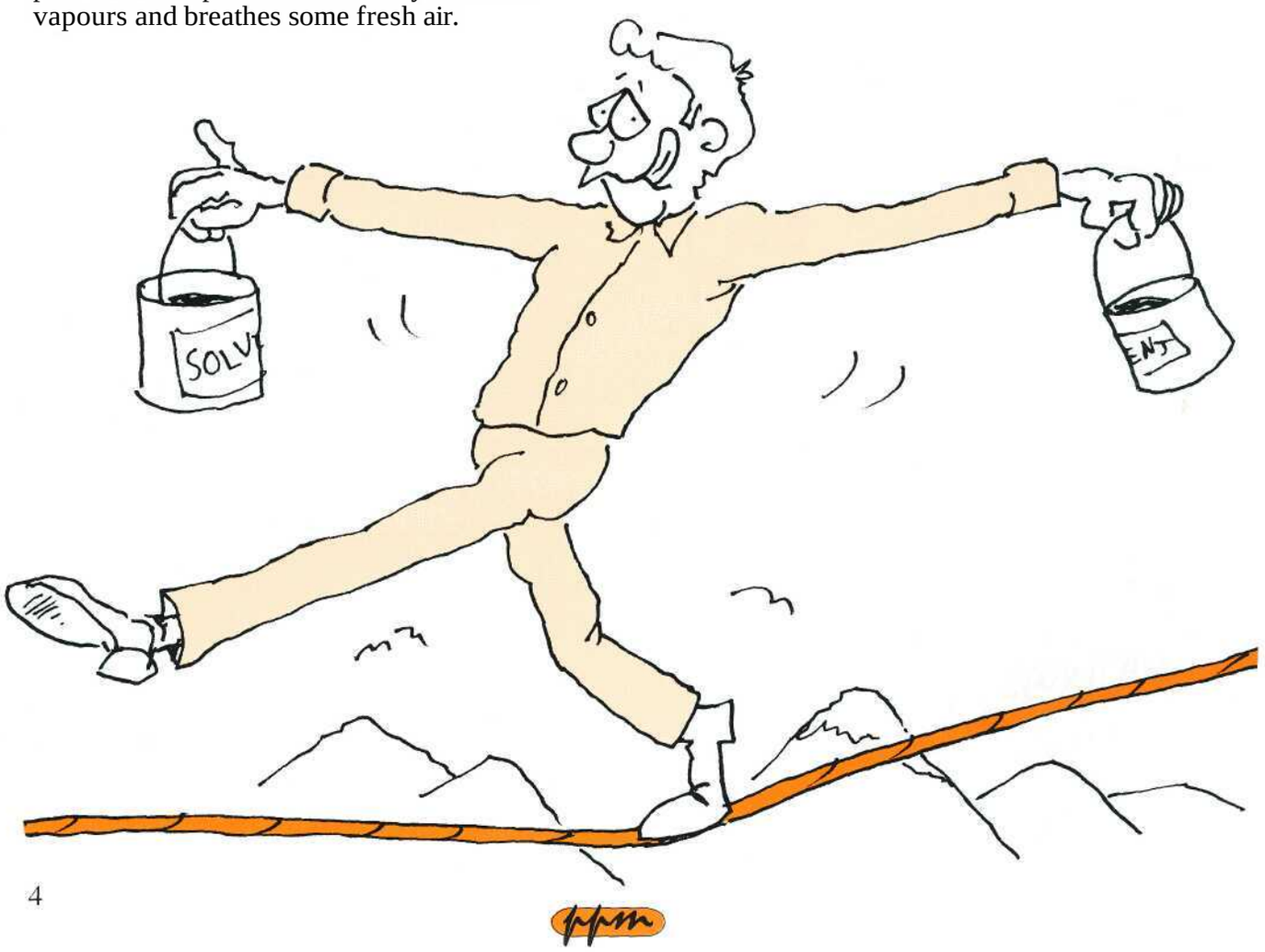
In the *acute* stage, the signal transmission between nerve cells is affected. The solvent interferes with one or several of the many hundreds of chemical substances involved in the communication between nerves in the body. Some damage to the actual nerve cells can also occur. This can result in nausea, dizziness and balance difficulties which usually pass when the person moves away from the vapours and breathes some fresh air.

The *sub-chronic* stage occurs after several years of exposure. At this stage, balance problems (even away from the solvent exposure) can be detected in medical tests. But there is still time for recuperation at least to some extent, as long as the person avoids exposure to solvents.

In the *chronic* stage, the damage to the nerve cells is accelerated, and more cells are being destroyed. Apart from balance problems, the whole psyche of the person is affected: forgetfulness, lethargy, short temper, and emotional outbursts are common. An affected person may have trouble remembering his or her own telephone number, or the reason why he or she walked into a room. Sufferers may lose their temper over a pittance.

Similar disturbances can be caused by exposure to heavy metals, for example in welding fumes, or heavy blows to the head, such as whiplash injuries.

Source: Swedish work environment institute 1993, *Forskning & Praktik*, number 4, pp 38—41, ref to: Odkvist L. M., Möller C., Thuomas K-Å., 'Otoneurologic disturbances caused by solvent pollution', *Otolaryngology- Head and neck surgery 106 (1992) pp 687-692; Odkvist L. M., Arlinger S. C., Edling C., Larsby B., Bergholtz L. M., 'Audiological and vestibulo-oculomotor findings in workers exposed to solvents anc jet fuel', Scand. Audiol. 16 (1987) pp 75-81.*



Fuming **mad!**

Some hot tips **for** welders

There are dozens of welding techniques, all producing different fumes at different levels. Apart from the different methods, the welding fumes have a different composition depending on which material is being welded. This leaves the welder in a maze of possible respiratory hazards. Here is a brief, practical guide to protection methods in a variety of welding situations.

Ground rules

- Keep you head out of the fume
- Keep your head upwind from the work, whether outdoors or in ventilated rooms
- Use general ventilation
- Ensure that fume build-up does not occur
- If at all possible, use local exhaust to capture the fume at the source
- Some welding equipment can be fitted with fume extractors — use them
- If fume cannot be reduced by the above procedures, personal respiratory protection must be used

General ventilation

- Ensure that general ventilation draws the fumes away from the welder without flowing into the path of other workers in the area
- Work as close as possible to the ventilation air outlets, and as far away as possible from the ventilation air inlets

Local exhaust

- The mouth of the exhaust must be close to the weld at all times
- When the welding zone moves, so should the exhaust — make sure the mouth of the exhaust is easy to move
- Do not place the mouth of the exhaust in such a way that the fumes flow past your face on their way to the extractor
- Ensure that the fumes are released safely and out of the way of other people in the vicinity

Ventilation air flow:

The welder's dilemma

Local exhaust as well as general ventilation must be sufficiently powerful to remove the hazardous air. On the other hand, if the air flow is too fast it may affect the welding process. A happy medium must be found.

In all welding processes, an air flow of at least 0.5 **m/s** is required to remove the fume

but...

MIG and TIG welding can be affected by air flows greater than 1 m/s

MMA welding can be **affected** by air flows greater than 3 m/s

Personal respiratory protection

- Use a particle respirator **for particulate** fumes
- If gases are present, both a particle filter and a gas filter must be used
- Beard growth and other factors may affect face-seal respirators. Other solutions include compressed air hoods, powered air purifying respirators, and positive pressure respirators

Flame processes

Gas welding

- Very little fume produced
- Gas may be produced at the flame. Carbon monoxide and nitrogen oxides may occur in hazardous amounts in certain situations, such as confined spaces.

Flame cutting

- **Particulate** fume is produced
- (Mechanical **cutting:**) A water table can be used to catch the fume and spatter
- (Mechanical **cutting:**) A cutting table with air extraction suction from underneath is another solution
- (Manual **cutting:**) Work upwind from the weld
- (Manual **cutting:**) Be careful when cutting painted **surfaces** — hazardous substances may be released by the flame: use breathing protection

Flame gouging

- Produces high concentrations of background **particulate** fumes
- Respirator wear may be **uncomfortable** because of the generated heat
- An extraction hood or exhaust duct may solve the problem. Air flow should be high volume, low speed

Flame preheating

- No fume produced (normally)
- Main hazard is in confined spaces, where breathing protection and local extraction must be used

Metal-arc welding

Manual metal-arc welding (MMA)

- Fume emission increases with the current used
- Keep your head to one side of the plume
- If work load is great, general ventilation may have to be supplemented with local exhaust
- Mild and low-alloy steels present little concern — care should be taken when welding stainless steel
- If you're using stainless steel electrodes, consult the **manufacturer for information** on fume emission
- Take care when using electrodes containing cobalt, molybdenum, manganese and vanadium. The fumes (oxides of the respective metal) from these electrodes have lower hygiene exposure limits than iron oxide.

Gravity welding

- As **for** normal MMA welding

Automatic metal-arc welding

- Copious fumes are emitted. Although the operator is normally well away from the weld, it may be a good idea to use a hood or similar to keep the background fume levels down.

MMA cutting and gouging

- Copious fumes are emitted. Refer to the section on Carbon Arc Gouging.

Gas-shielded welding (MIG, MAG)

General

- The shielding gas might be a problem, since it could displace air.
- Local exhaust might be a problem, since air flows above 1 m/s could disturb the shielding gas around the arc.
- Ozone levels can rise above exposure limit level.
- The level of toxic materials depends on the material being welded.

Mild and low-alloy steel

- Total fume should be kept below 5 mg/m^3.

Stainless and high-alloy steel

- Efficient fume extraction is required in most situations.
- Breathing protection should be used in confined spaces.
- Improved extraction is required if ozone can be detected by smell.

Copper and copper alloys

- Toxic fumes of copper oxide are produced — risk of copper fume fever.
- Local exhaust and respiratory protection should be used.

Aluminium and aluminium alloys

- Keep fume concentration below 5 mg/m^3
- Biggest problem is ozone. Ozone may be produced far away from the arc (1 m), and will escape local exhaust. Filter protection will only have a limited life against ozone. Supplied air may be the only solution.

Nickel and nickel alloys

- Chromium levels may be too high.
- Respirator should be worn at high work loads.

Cored electrode welding

- Very efficient fume removal may be necessary if welding stainless steel, because of the presence of chromium and nickel in the fumes.
- Some cored electrodes may contain barium in the flux, requiring very efficient exhaust.
- Some welding guns can be fitted with point exhaust. Filters must be exchanged regularly, and spillages avoided. Wear particle respirator when changing filters.

Handy Hint

Do you know what you're welding?

Plasma welding and cutting

- Nitrogen oxides and ozone may be produced in concentrations above the exposure limit.
- Particle fumes are low in welding, high in cutting.

Tungsten Inert Gas welding (TIG)

- Very little particulate fume.
- Local exhaust may be necessary when welding stainless steel, due to chromium and nickel levels.
- In small spaces, the inert gas may displace air.

Air carbon arc gouging

- Copious amounts of metal oxide are produced (type depends on the metal being welded).
- Full breathing protection is essential.
- Local exhaust is impractical. Best solution is a specially designed ventilated work booth. Even here, full breathing protection should be worn.

Oxygen arc cutting

- **It is important to carefully examine any paint or other treatment of the material being welded.**
- **Particle respirator should be worn in open spaces.**
- **In enclosed spaces, full breathing protection is required.**
- **There is a risk of oxygen enrichment of the atmosphere — efficient ventilation should be operating in conjunction with personal breathing protection.**

Plasma, flame and electric arc spraying

- **Particle respirator should be worn, even in the open air.**

Submerged arc welding

- **Very small amounts of gas or fume escape during this process.**
- **If airborne dust is apparent during flex handling, a particle respirator may be recommended.**

Brazing, soldering, braze welding

- **Low concentrations of pollutants.**
- **Brazing alloys containing cadmium should be avoided.**
- **Fume extraction may be required at production-line work.**
- **Manual brazing in heavy work loads may require local exhaust.**
- **Respirator to be worn in small spaces or during long periods of welding.**
- **Soldering fluxes may cause allergic reactions in some workers (uncommon)**

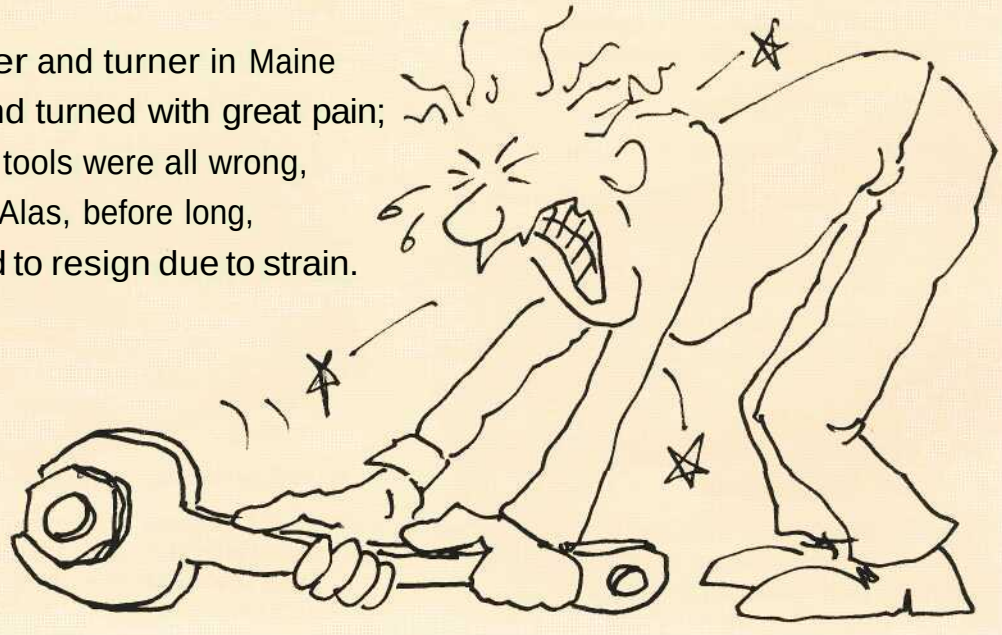
Working on coated steels

Steel can be coated with a number of materials, the most obvious being paints, plated coatings (such as galvanising), plastics (which can produce very complex gases when heated), and hydrocarbons (such as oils). Coatings may also contain extremely hazardous materials, such as beryllium, or less hazardous materials (but still with a low exposure limit), such as cadmium, copper, cobalt, chromium, lead and nickel. Some marine paints may contain arsenic or mercury.

- **Expert advice should always be obtained prior to welding any coated steels.**
- **Ventilation, exhaust and personal protective equipment should suit the material being welded.**
- **Never use degreasing or other cleaning solvents near welding flames or arcs.**
- **Always wait for the solvent to evaporate before starting to weld.**

Source: Jenkins N., 1986, *The facts about fume — a welding engineer's handbook*, The Welding Institute. Cambridge, Great Britain

A fitter and turner in Maine
Fitted and turned with great pain;
His tools were all wrong,
Alas, before long,
He had to resign due to strain.



Common substances that cause respiratory irritation

...and allergy

Acrylates

Acrylates and cyanoacrylates can be very irritating to the respiratory tract, and may cause skin allergies. Acrylates are used in glues, plastics and other materials. It is the monomers in the acrylates that cause the problems: finished, hardened plastics based on acrylates are not allergenic.

Amines

Amines are related to ammonia, and are often very alkaline and irritating to the breathing. Some amines also clearly cause eye discomfort. Respiratory irritation is caused by the following amines, among others:

- **Piperazine**
- **Dimethyl ethanol amine**
- **3-methyl aminopropyl amine (3-DMAPA)**
- **Ethylene diamine**
- **n-methyl morpholine**

Some of these substances may also cause asthma. Amines can also occur naturally in piggeries, animal farms and other places where proteins are broken down by micro-organisms.

Anhydrides

Anhydrides of phthalic acid, trichloro-phthalic acid and trimellitic acid are known for their allergenic properties. IgE antibodies have been found in people with respiratory complaints. The anhydrides mentioned here may not be the only ones to cause sensitisation.

Azo-dicarbon amide

Azo-dicarbon amide is used in the plastics industry. May cause asthma.

Chloramine-T

Also known as toluene sulphone chloramide, chloramine-T is used as a disinfectant in super-markets, commercial kitchens, laboratories and other work places. Serious cases of asthma have been documented. IgE antibodies have been found in the blood of some sufferers.

Animals

Furry animals and birds have long been known to cause allergies. Anyone working with animals and birds, for instance laboratory personnel, run the risk of respiratory irritation and allergies. In laboratories, rats, mice and other test animals are often born with protein in the urine. The allergens in the urine may be spread in the sawdust from the cages.

Enzymes

Enzymes are proteins, and can cause allergic reactions. They are used in a variety of applications, for instance in food production (e.g. papain to tenderise meat), in washing powers and detergents (e.g. amylases and proteases as spot removers), and in bakeries (e.g. alpha-amylase).

Formalin - formaldehyde

Formaldehyde is a strong irritant to the eyes and the respiratory system. Reactions may vary, but in high concentrations, formaldehyde is severely irritating to all people. Some people are very sensitive to the substance, even in very low concentrations.

Formaldehyde is used in glues (for instance in chipboard), insulation materials, textile and paper treatment, and in paints. Formalin is formaldehyde in a water solution.

Hair care preparations

Hairdressers and barbers may become sensitised to hair sprays, henna dying agents, fix and other hair care chemicals. Hair sprays generally have an irritating effect. The composition of the products vary from manufacturer to manufacturer, and the formulations from the same manufacturer may be altered from time to time.

Some hair bleaches may also cause asthma, probably due to persulphates in the bleach.

Isocyanates

Isocyanates are used in polyurethane plastic manufacture. These plastics are found in plastic foam, hard plastics, sealants, floor varnish, car duco, and paints. There are many kinds of Isocyanates, including TDI, MDI, HDI, PAPI, IPDI and TMDI.

Special regulations apply when working with some Isocyanates. For instance, when spray painting cars with TDI ("two-pack paint" containing toluene di-isocyanate) should only be undertaken if the painter is using supplied air respiratory protection.

Isocyanates are also often used in conjunction with amines.

Foodstuff

Several types of food can cause allergies - usually in the preparatory stages, for example, the dust from unroasted coffee and tea leaves. The drinks themselves have no allergenic effects.

Other foods include egg and milk powder, soy, spices, and papain.

The problem is further compounded by allergenic micro-organisms forming during harvesting, drying, transportation and storage of the foodstuff.

Flour allergies are not uncommon among bakers, but take a long time - around ten years - to develop. Certain additives in flour, such as the enzyme alpha-amylase, can have special allergenic effects. Some bakery workers may become sensitised to alpha-amylase without having any allergic reactions to the flour itself.

Soldering fumes

Solderers may suffer discomfort from the flux used in soldering. The flux often contains resin and amines. The resin contains an acid which has been shown to be particularly allergenic. Plastic pyrolysis by-products may also occur in soldering.

Metals

Pure metals and metal alloys may occur as the metallic materials we can easily recognise, or may be in the form of inorganic salts. The following metal salts are suspected of causing allergic reactions in the respiratory system;

» **Beryllium**
- **Cadmium**
- **Cobalt**
- **Chromium**
- **Nickel**
- **Vanadium**
- **Tungsten**
- **Platinum**

Oil mist and cutting oils

Respiratory conditions may be caused by oil mist, sometimes with pneumonia-like effects. Cutting oils are used to lubricate and cool down the metal while it is being cut or drilled. Cutting oils usually contain mineral oils, as well as a number of additives, such as anti-corrosion agents, colouring agents, nitrites, sulphur, chlorine, bactericides, surface treatment agents and anti-foaming preparations.

Ozone

Ozone is a severely irritating and poisonous gas that can cause damage to the mucous membranes of the lungs. The gas is formed when the oxygen in the air is exposed to high temperatures, for example in welding and photocopying. Ozone is also used in various bleaching processes in the industry.

Paper dust

Paper dust can be a respiratory irritant in itself, and can also carry remnants of chemicals from the manufacturing process. Self-copying paper contains colouring agents and various solvents, and should only be used in well-ventilated rooms and a relative humidity of at least 50 per cent.

Polymers (plastics, rubber etc.)

Finished plastics are usually considered harmless. However, pyrolysis or breaking-up may occur at high temperatures, for instance in melting and heat-shrinking plastic sealing film.

Pyrolysis often generates strongly irritating acids (e.g. acetic acid) and aldehydes, such as formaldehyde, acetaldehyde and acrolein.

The pyrolysis products vary according to the type of plastic:

- **Polyester and silicone forms phenol**
- **Nylon forms ammonia**
- **Soft PVG forms benzene, phthalic acid anhydride and hydrogen chloride**

Platinum

Platinum occurs naturally together with iron, copper and nickel. Purifying processes may generate a yellow platinum powder, used in chemical, photographic and electro-chemical industries.

Platinum powders and salts have been associated with eye irritation, runny nose, coughing, asthma and urticaria (a skin condition).

Polyurethanes

Polyurethanes are a group of plastic materials with a vast array of applications. The advantage of polyurethanes is that they can be made into anything from very soft foam material to very hard and resilient plastics. They are used in furniture padding, shoe soles, refrigerator insulation, pipes and heat ducts, car duco and marine paints.

Respiratory complaints are usually caused not by the polyurethane itself, but by the Isocyanates and amines which occur within it.

Normally, finished polyurethane products are harmless, but Isocyanates can be released when the material is heated, e.g. during welding.

Textile dyes

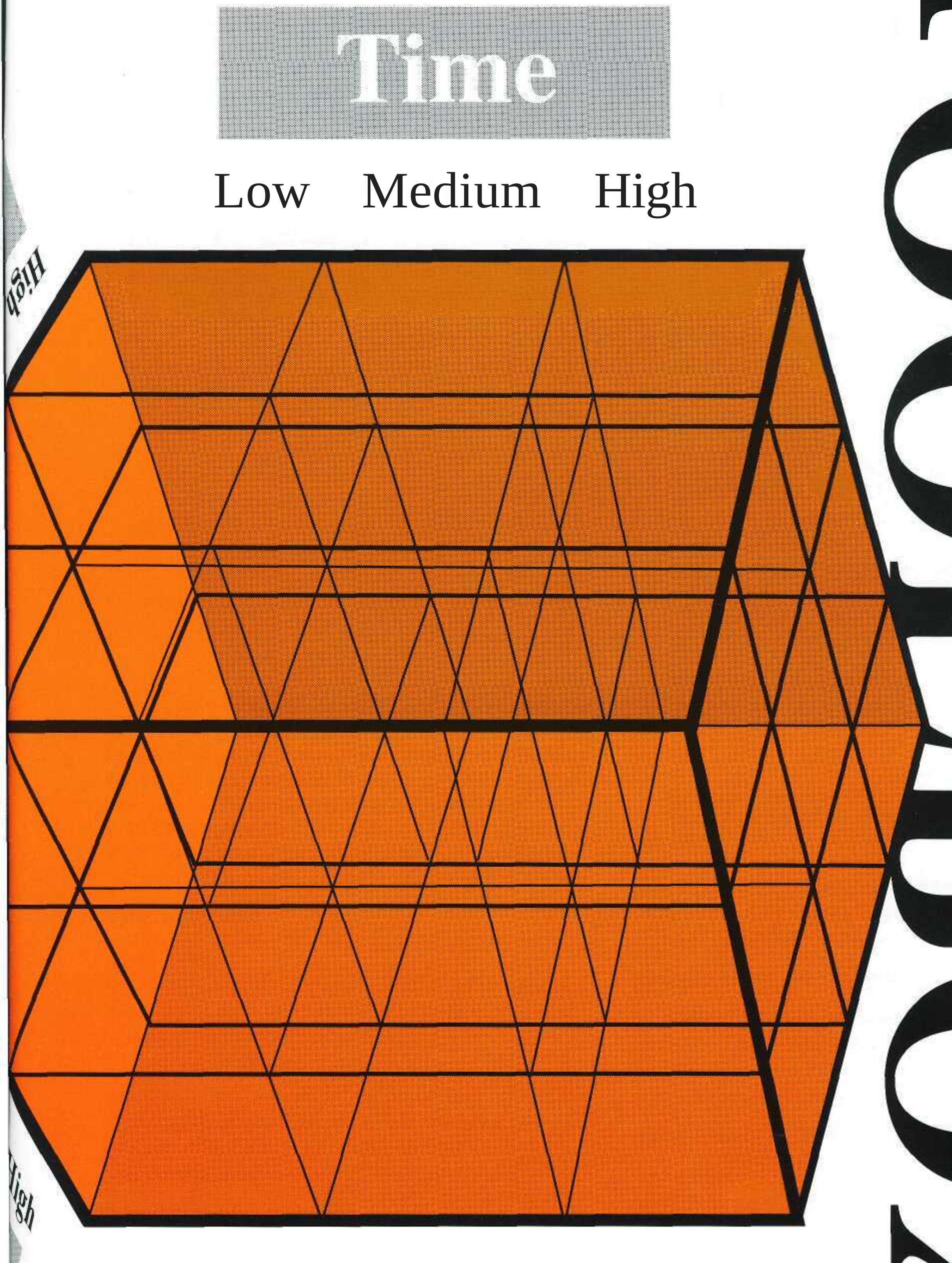
Fabrics should ideally withstand washing and be light-fast. Special dyes are used that are chemically bound to the textile fibres. These dyes may cause allergies among textile workers.

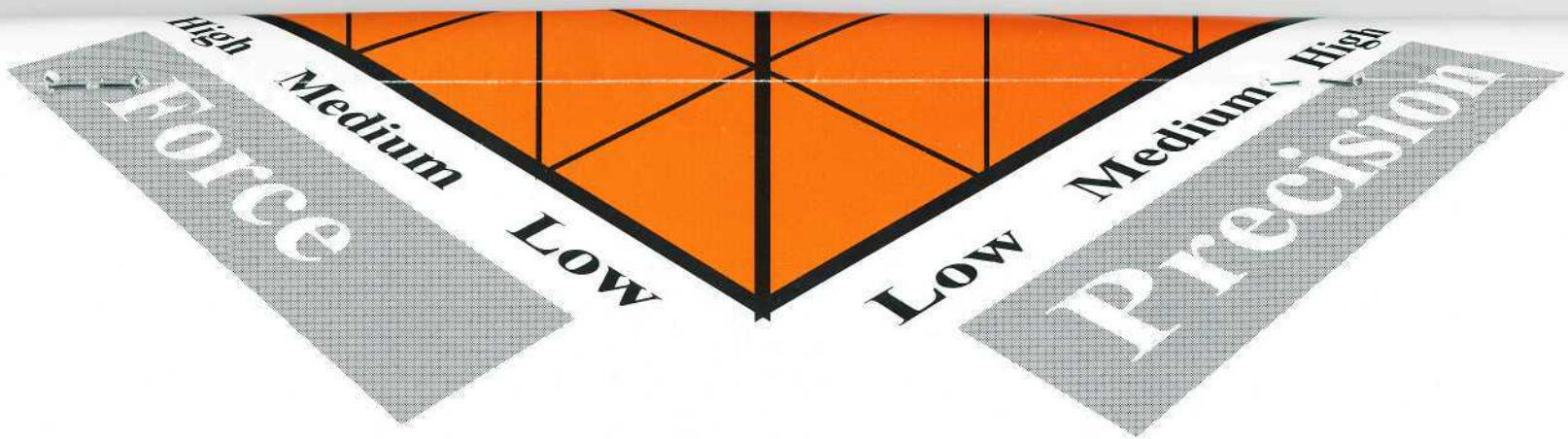
Sulphate and persulphate

Nickel sulphate, potassium persulphate and ammonia persulphate have been found to cause sensitisation and asthma in some cases.

Source: Belin, L., Fregert, S., Wass, U., Krook, K. 1989; *Yrkesallergier*; Swedish WorkSafe committee, Stockholm, Sweden

a handy TOOLBOX





Many workers use hand tools. Some use different tools some of time, some use the same tool all of the time. This handy toolbox gives you an idea of how to gauge the general strain involved in using your tools.

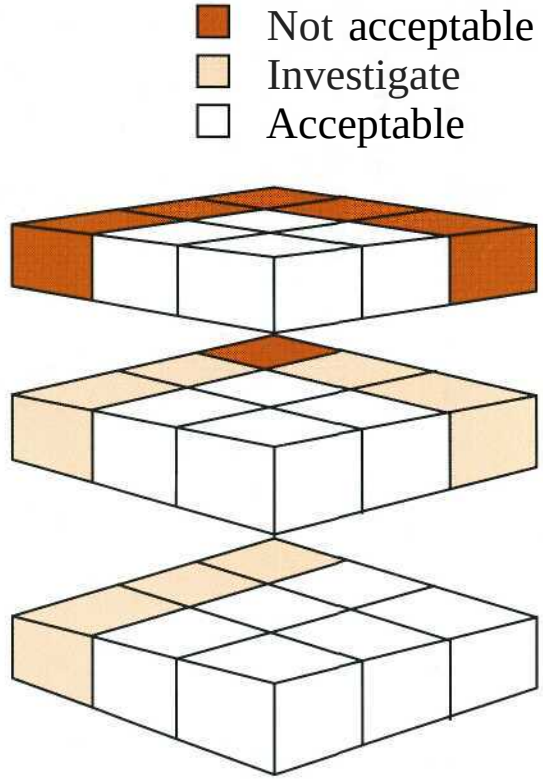
Researchers use three factors to characterise your work situation:

- The FORCE needed to operate the tool
- The PRECISION required to use it
- The length of TIME it is being used

These three factors add up to strain on your hands, arms and body. For instance, a pair of bolt cutters **don't** require much precision, aren't used for a long time, but require a lot of force; a pair of hair-dresser's scissors demand a lot of precision, are used for extended periods, but don't require much force; cutting sheet metal with shears requires both precision and force, and may be done over long periods.

By combining the three factors and using the toolbox, you can rate the overall strain a tool places on your body. Tools in the bottom front part are easiest on your body; tools at the rear and high up can be very straining to use.

The toolbox is not a precise scientific measuring instrument, but can be used as a guide for discussion in the selection and use of hand tools.



Does your work lunch work?

Putting the right stuff in your lunch box

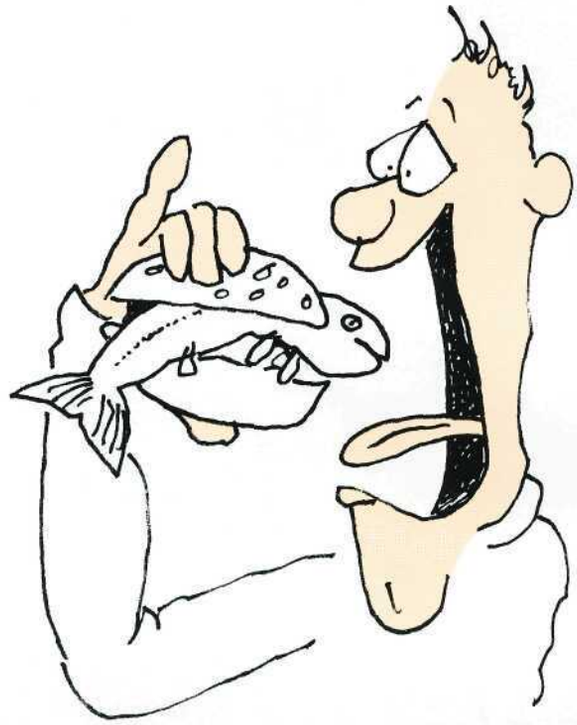
Hand on your heart (and on your belly): do you know what's on your lunch plate or in your lunch box, really? The food you eat during a working day is crucial: it should give you the energy you need, without padding your diet (and your body) with unnecessary food.

"I'm a light eater"

A seemingly "light lunch" can be heavy indeed, if your use mayonnaise and cheese to "spiff up" your salad and lean ham.

"I'm a take-away fan"

The meat in take-away food is often all right, but the rest is a worry. Cheese, mayonnaise and dressing add fat, not nourishment. A couple of slices of cucumber and tomato are there for looks, not health. A can of soft-drink contains eight or more teaspoons of sugar. And take-away food is often lacking in Fibre.



"Last night's dinner is good enough for me"

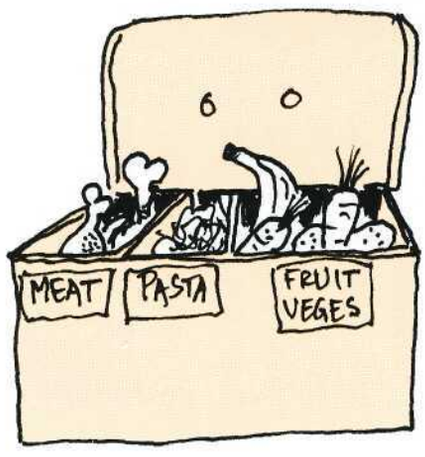
Leftovers (from healthy meals) are good, but there's a catch: it is easy to forget to "top up" the meal with fresh bread, vegetables and fruit.

"I'm a dairy person"

Keep in mind that a single slice of ordinary cheese contains a teaspoon of fat. If you're into yoghurt or buttermilk, make sure you add muesli and veges for fibre, and fruit and berries for vitamins.

"Sugar means energy"

A chocolate bar, a sweet cuppa, and a banana. Sure, it contains energy — but only short term energy. The meal gives a boost to your blood-sugar level, but not much sustenance. The banana is healthy and provides fibre, but not enough.



The perfect lunch formula:

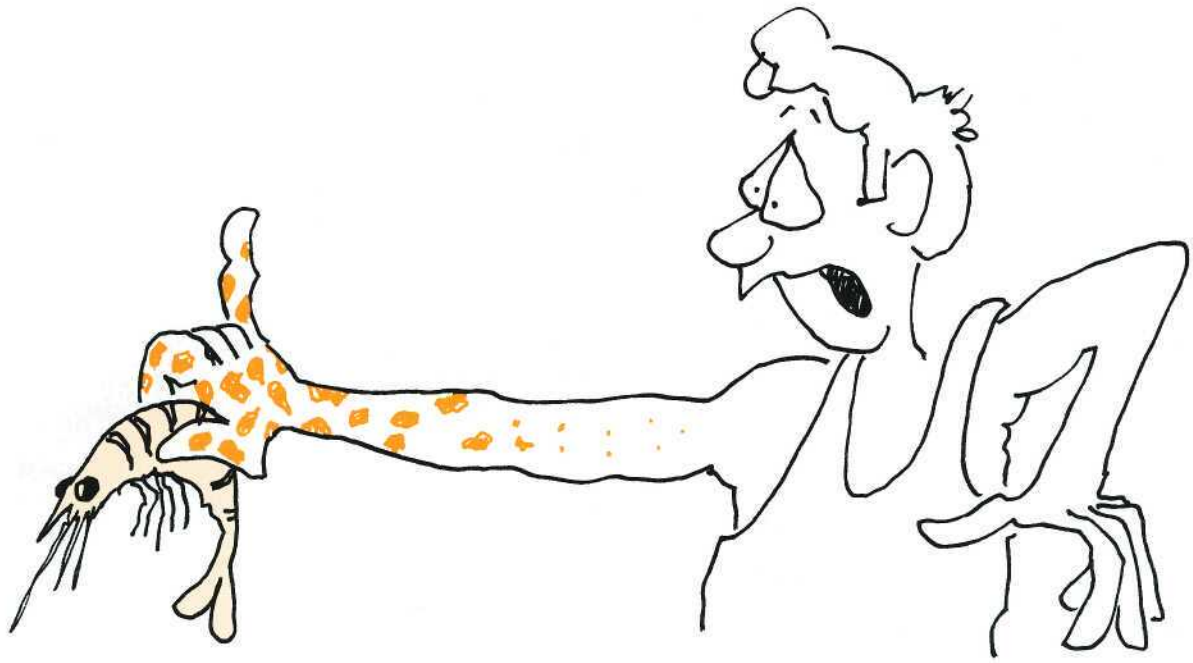
The only thing you have to think about when preparing or buying your working lunch is this simple formula:

¼ meat

¼ potatoes, rice or pasta

½ vegetables

Source: Wikmar K., 1995, *Kroppen!*, number 1, pp 8—9 (insert in *Arbetsmiljö* magazine)



The food that makes you allergic...

...without eating it

Food allergies are common. Some people fall ill from eating dairy products; others develop hives when eating shellfish; yet others can't cope with food additives and colouring agents. But foodstuff can cause severe allergies even if they're not eaten — especially among workers in the food industry.

The most common complaints of inhaled food dust include hay fever, irritated eyes, runny nose, sneezing and sometimes asthma. Allergies from handling food can include skin rashes, hives and even eczema, often in conjunction with hay fever.

Not all allergies arc caused by occupational handling of foodstuff, and not all symptoms are allergic reactions. However, some substances present in plants and animals can cause real allergies if you are exposed to large quantities over a long time. Casual exposure to spices, flour and other foodstuff when cooking at home is not associated with any direct risk.

Allergic reactions vary from person to person. The allergenic properties of foodstuff also varies, depending on handling techniques, drying methods, pulverising processes and so on. It is therefore difficult to present a definitive list of allergy-producing food products. Here are just a few examples:

Spices

Spice treatment and handling is often done in dusty conditions. Therefore, spice processing can sometimes lead to respiratory complaints. All dried spices are possible risks, and it is impossible to advise which spices are more likely to produce allergies than others.

- **Garlic, coriander, curry powder, nutmeg, ginger, paprika**

—*have been found to cause problems*

- **Cinnamon**

—*can cause skin rashes or eczema*

- **Soya**

—*could also cause allergic reactions*

- **Meat and fish**

—*Fish, shellfish, raw meat, meatjuices can cause allergies*

- **Fruit, seeds and vegetables**

—*Not only exotic plants can cause allergies, but also common domestic ones, such as tomatoes, cucumbers, carrots, lettuce, onions, celery, dill etc.*

—*Coffee dust (raw, unroasted) and tea leaves have also been shown to cause allergies. The beverages coffee and tea, however, do not have any allergic effects.*

Food powders

- **Egg powder**

—*Egg powder has been found to cause hay fever, influenza-like symptoms and fever. The allergies are not only found in the manufacturing of the egg powder, but also in the use of it. In one case, egg powder was brushed onto meat by hand. This was no problem. When the company started spraying on the powder using compressed air guns, the staff in the area developed respiratory conditions, including runny noses, coughing, and difficulties in breathing. The problem was caused by the inhaled aerosol of egg powder.*

- **Milk powder**
  —*may cause allergic reactions in sensitive people if handled in the wrong manner, e.g. if spread in dust form.*
- **Enzymes**

Enzymes can cause allergies, including asthma. The use of enzymes is on the increase, rising by 8—12 per cent annually. Two important enzymes in the food industry include:

- **Alpha-amylase**
  — *Added to flour to speed up the rising of bread.*
- **Papain**
  —*A meat tenderiser.*
- **Flour**
  —*Flour allergy is not uncommon among bakers. The first stage is often "baker's nose" or "baker's cold", with sniffling and runny nose. A secondary stage, "baker's asthma", may or may not follow as a complication. The flour allergy is relatively weak — it can often take up to ten years to develop, even if you work with large quantities of flour. However, there could be other things in the flour that cause the allergic reactions, such as alpha-amylase additive, or insects and micro-organisms in the flour, such as mites.*

Risk groups

Naturally, workers in food processing plants are at risk, since they are often exposed to large amounts of the allergenic substances. People involved in food preparation and cooking, such as restaurant and canteen workers, are usually exposed to lesser amounts, but are more likely to touch the food with their hands, and may get foodstuff splattered or spilt on their arms and faces. This could result in skin rashes (contact-urticaria) as well as contact eczema. Skin rashes usually appear immediately upon handling the food. Eczema reactions normally occur after several hours or even the next day. This is why it is important to remember not only what materials were handled just before any skin problems occur, but also the work performed on the previous day.

Not always occupational allergies

It is not always possible to attribute a food allergy to occupational food handling with any degree of certainty. For example, if a food worker develops sneezing, teary eyes and a runny nose whenever he is peeling potatoes, it might seem obvious that it is an occupational allergy. This supposition is further strengthened when he experiences an itchy mouth and swollen lips when eating hazelnuts, apples, peaches, cherries, carrots and tomatoes. Surely, this is an occupationally induced allergy?

Not necessarily. The allergy could be caused by tree pollen from birch or other trees. The food allergy is a side-effect, since the allergenic substances in the pollen are also present in hazelnuts and the other fruit and vegetables mentioned above.

Similarly, people who have become allergic to certain weeds or plants may, as a side-effect, also become allergic to coriander or other spices.

Keep dust and moisture at bay

Whatever the industry, it is always best to minimise exposure to dust and aerosols, no matter how benign. The two most common problems in the food industry are:

- **Dry dusty food products may cause respiratory allergies.**
- **Raw, moist products may cause skin conditions. Often, it is not the foodstuff but the moisture that causes the problem.**

Source: Bergmark G., Meding B., 1990, 'Se upp for maten som du inte äter!', *Sjukav Jobbet— om överkänslighet och allergi, pp 24—25, Arbetsmiljö-Swedish Work Safety Society, Stockholm*

Sleeping power...

...or power sleeping

A brief siesta in the afternoon invigorates the body and mind, increases work performance, and contributes to a lower accident rate, according to sleep experts. Even ten minutes of sleep in the afternoon can compensate for a whole hour of ordinary night-sleep. The best effects, however, are achieved if you sleep for half an hour or so.

Researchers believe that even two or three minutes of sleep can get you over the afternoon "dip" in alertness.

Sleeping tips for shift workers

- **Make sure you sleep well the day after a night shift**
- **Have a nap just before your shift. Sleep either less than half and hour or more than an hour and a half — nothing in between. Why? Because then you avoid the risk of waking up in the middle of your deep sleep cycle, which can make you feel groggy and sluggish.**
- **If you come home and don't feel sleepy, don't go to bed. You don't need your normal sleep quota every night.**
- **If you can't sleep, get up and go to another room. Don't return to bed until you unwind.**
- **Forget about counting the hours you sleep: instead, trust your body's own capacity of adjusting the sleep it needs.**

Source: *Kroppen!*, 1995, 'Plikten kallar — till vilrummet!', number 1, p 7, ref to sleep specialist Akerstedt T., (supplement to *Arbetsmiljö*); *Sömn & Skiftarbete*, Swedish Work Environment Fund

CHEMICAL FACT

Sulphur dioxide

Characteristics:	Colourless gas with sharp smell, or chilled to colourless liquid
Aust TWA:	2 ppm (STEL: 5 ppm)
Health hazards:	Pain in nose and mouth. Tear producing. Coughing and impaired breathing. High concentrations can lead to lung oedema, which occurs after several hours or days after exposure. Skin and eye splashes of liquid sulphur dioxide can cause frost injury and corrosive damage. Risk of permanent eye damage.
Inhalation:	Fresh air and rest. Keep victim warm. Artificial respiration and oxygen may be required. Transport to hospital.
Skin **contact:**	Remove soiled clothing immediately. Rinse skin with copious amounts of water. Frost injuries should be treated by physician.
Eye splashes:	Rinse immediately with water for 15 minutes. Keep eyelids well apart. Then transport to hospital or eye specialist.
Prevention:	Use closed systems if possible. Mechanical ventilation and local exhaust may be required. Sulphur dioxide gathers at floor level. Keep containers tightly closed. Eye rinse stations and emergency showers should be available if liquid sulphur dioxide is part of the handling procedure. Avoid heating and welding in the area.

Source: Skyddsblad

Up in the air

Part II

Ventilation solutions

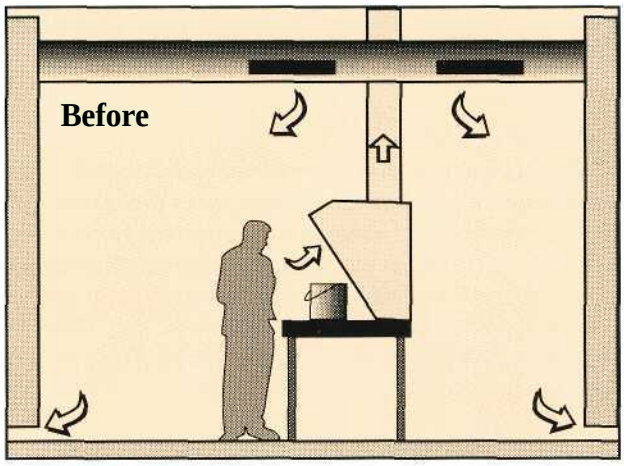
In the previous issue of PPM we outlined the various types of ventilation and equipment available. In this issue we will address various ventilation solutions from a practical point of view. The selection and implementation of a ventilation system is a process that should be conducted with care, and that requires insight and understanding of various possible methods of ventilation.

Ventilated work boxes

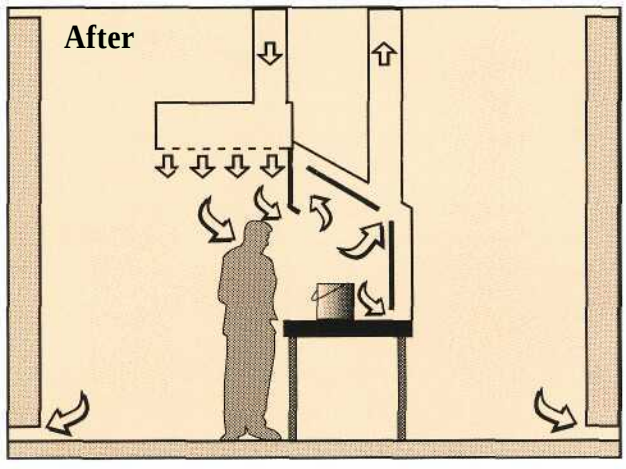
If the work performed is confined to a specific area, such as gluing, paint mixing, hand washing and so on, a ventilated work box may be the best solution. The word "work box" may be a little misleading, in that it doesn't have to be a completely encased box.

A work box can be a relatively simple construction, made from metal sheeting or other suitable material. Note that the material must be suitably resistant to the substances used in the box, e.g. acid or solvent resistant.

Our "before and after" example concerns a real case in a paint mixing room.



Before the installation of a work box, paint mixing was done at a work bench equipped with an exhaust hood running along the back end of the bench. Air input was through slots in an overhead duct. The exhaust air volume was around 1,000 m3/h. Additional air exhausts were located at floor and ceiling level. Measurements at the operator's face region detected xylenc, toluene and butanol in relatively low concentrations. Yet, the workers in the mixing room complained of frequent headaches.



In our "after' example, the box is about 1.5 m deep, 2 m wide and 2.5 m high.

The air input is about 2,000 m3/h, is mounted above the worker's head inside the booth, and is directed downwards.

The back of the booth is double-walled, where the wall facing the worker is fitted with slots through which the air is sucked out. The exhaust air volume is around 2,300 m3/h, that is, somewhat greater than the air input.

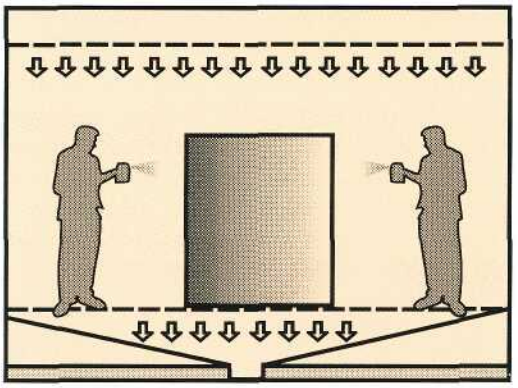
Note that the construction of the work box complies with the requirement outlined in our

previous article, namely that the clean air flows past the worker's breathing region, and away from the face. The worker is always "up-wind" from the contamination source, without the possibility of the clean air picking up any fumes.

When the same measurements were taken, no traces of toluene or butanol were detected around the worker's face, and only very minute amounts of xylene (6 mg/m3). The exposure levels for the operator were calculated to be as little as 40% of the "before" set-up.

Up-down, left-right

When designing any sort of ventilated area, it is important to keep in mind the direction in which the air flows across workers and contamination sources. There are three main choices:

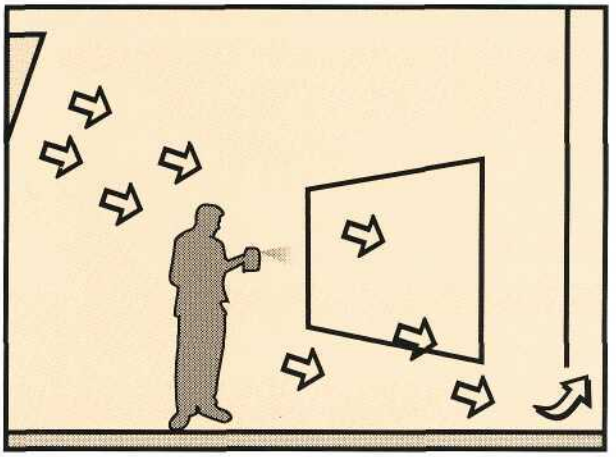


Vertical ventilation

The air input is evenly distributed in the ceiling, while the exhaust is taken out — as evenly — at floor level. Floor exhaust can be arranged without any major modifications to the floor itself (for instance, cutting up a concrete floor) by creating a raised second floor about 0.8 m above the existing floor.

Vertical ventilation is suitable for:

- **Spraying and handling large objects**
- **Spraying from various directions (e.g. if the operator has to move around the object and spray from all sides)**
- **Spraying and manoeuvring objects that hang from the ceiling.**



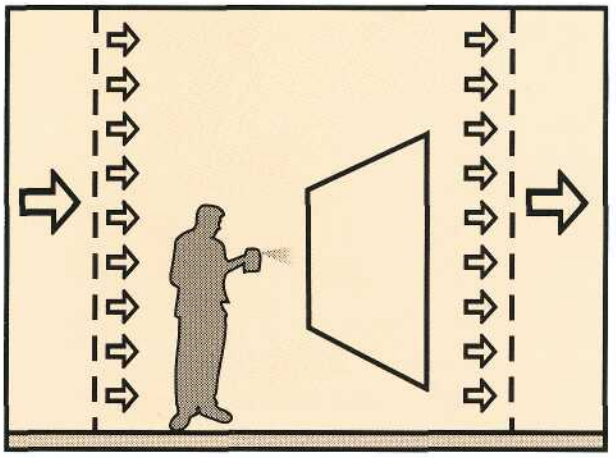
Diagonal ventilation

Air input is above and behind the operator. Exhaust is in front and below. This creates a diagonal air flow away from the worker's face.

Diagonal ventilation is suitable for:

- **Situations where most work is done with the operator facing in one direction**
- **Spraying in one main direction**

Note that work should not be performed "down-wind" from the contamination source, or near the exhaust outlets.



Horizontal ventilation

Air input is through perforations across an entire wall. Exhaust is through the opposite wall. This creates a pleasant and effective air flow through the room, without any sense of draft.

Horizontal ventilation is suitable for:

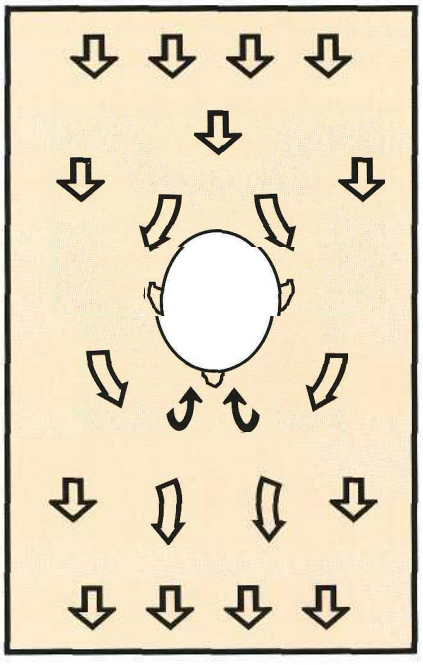
- **Small rooms where work is done in one main direction**

Note that work should not be performed "down-wind" from the contamination source or near the exhaust outlets.

In many instances, the general air flow can be boosted by local work boxes or air inputs above or behind the worker.

Turbulent pitfalls

Air flow is like a river. An even, unobstructed air flow is like a river with a smooth sandy bottom and no turns or meanders. The water flows evenly and smoothly at equal speed down the river. But if you place an obstruction, such as a large rock, in the path of the water, you create turbulence. If you watch a rock in a narrow, fast-running stream, you will see not only how it splits the water flow, but also how it creates waves and curls in the water downstream. Indeed, if you look closely, you can see how some of the water on either side of the rock swirls in on itself and runs back towards the rock on the downstream side. For a moment, the water runs upstream.



The same thing happens with air. If your ventilation system creates an even stream of air, a worker standing in that stream might act as the rock in the river. The air might swirl around the worker's face, actually drawing fumes from the contamination source back up towards the breathing region.

In many cases, this back-draft effect can be avoided by spreading the air supply over a larger area. For instance, a single air inlet behind the worker could be replaced with a perforated large area above and behind.

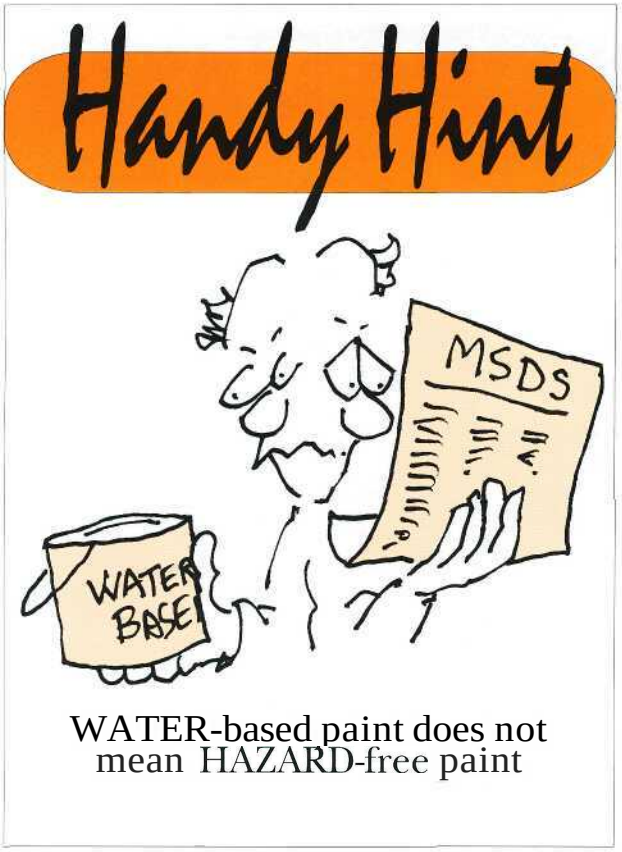
Another, and perhaps better, solution would be to place an additional air inlet above and close to the worker. This second inlet could serve to push the back-draft down below the breathing region.

People, machinery, vehicles — all can contribute to unexpected ventilation problems. To return to our river metaphor, certain parts of a river (even a fast-flowing one) can become calm pools of still water. Similarly, parts of a ventilated room can become pockets of still air, due to the shape of the room, furniture, machines and so on. If this air contains harmful substances, well, then you have created a second problem in the course of solving the first one.

Other troubles

The desired air flow in a ventilated room can be ruined by secondary flows caused by other sources, such as an open door or vehicle access gate. If doors or gates must be kept open, it may help to consider air locks (i.e. double doors — you close the door behind you before opening the second door in front of you). Transparent plastic curtains that can be driven or walked through may also keep interference down while allowing access. Other solutions include air curtains, i.e. a thin sheet of air that is blown down from a slotted pipe above the door and sucked out at floor level (although this may cause other undesirable disturbances to the air flow pattern in the room).

[1] Source: The Swedish Work Environment Fund, (publ. year not stated), *Riskerna med Lösningsmedel, medicinska erfarenheter- tekniska åtgärder*, Stockholm. Sweden



WATER-based paint does not mean HAZARD-free paint

HAND tools can give you BACKache

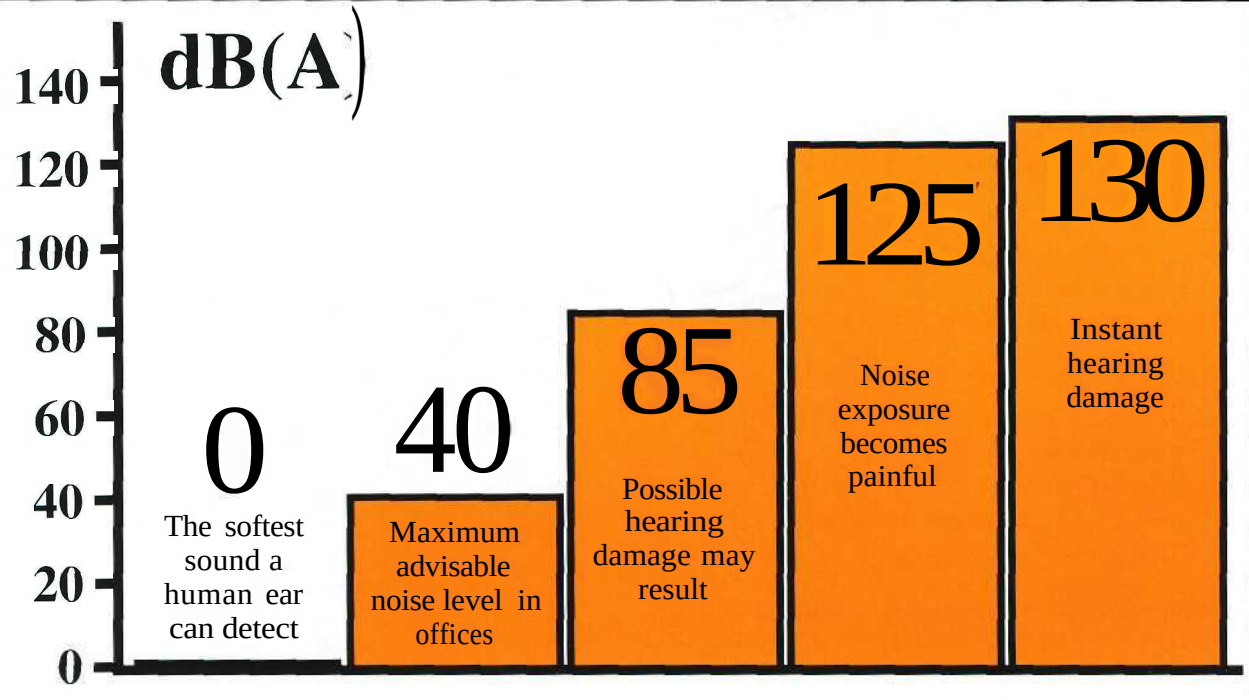
CHEMICAL FACTS

Carbon disulphide

Synonyms:	Carbon bisulphide
Characteristics:	Colourless liquid
Odour:	Unpleasant odour
Aust TWA:	10 ppm (STEL: 30 ppm)
Fire:	Very flammable. Vapours may form explosive mix with air. Risk of explosion in contact with nitrogen dioxide, zinc, other metals.
Health hazards:	Respiratory pain, headache, nausea. High concentrations can cause impaired breathing, hallucinations, cramps and loss of conscience. Extended, repeated exposure can cause irritability, headaches, poor sleep, loss of appetite, memory loss, depression, stomach complaints, visual disturbances, heart disease.
Inhalation:	Fresh air and rest. Keep warm. Rapid transport to hospital. Artificial respiration or oxygen may be required.
Skin contact:	Remove soiled clothing. (Note: clothing is a fire hazard). Wash skin thoroughly with soap and water.
Eye splashes:	Rinse several minutes with water. Keep eyelids wide open. Consult eyespecialist.
Ingestion:	Immediate hospital transport. Induce vomiting if journey is longer than 30 minutes, and only if the victim is conscious. Give water or other beverage before inducing vomiting.
Message to doctor:	Do not administer adrenalin, noradrenalin or similar.
Prevention:	Use closed systems if possible, otherwise mechanical exhaust. Vapours gather at floor level. Keep containers tightly closed. Strive to eliminate direct contact with the material. Emergency showers and eye rinse stations should be available. No smoking, open flames, or sparks. No welding. Spark-free tools. Electrical equipment should be explosion-proof.

Source: *Skyddsblad*

IMPORTANT NOISE LEVELS



Source: Arbetsmiljö, 1993, number 5, p 51

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