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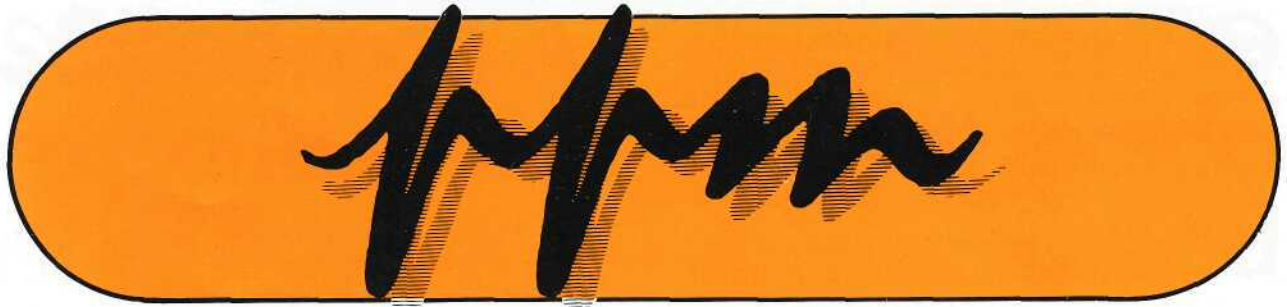
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## professional protection magazine

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# Lead painters all at sea

**A US study of Navy personnel showed that nearly two out of three workers were exposed to lead levels at or above the exposure limit value of  $50 \mu\text{g}/\text{m}^3$  during paint removal work.**

The work included chipping and grinding procedures. The study, published in the July issue of *American Industrial Association Journal* found that the airborne lead concentration was higher than the exposure limit, even where the lead content in the paint was less than 0.1 per cent. However, although the blood concentration of lead rose during and after work, the lead content in the workers did not exceed the allowable level of  $40 \mu\text{g}/100\text{g}$  of blood.

The report recommended the use of local exhaust, needle guns and dust collectors on the grinders.

The removal of paint on a ship could take as long as three years.



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Source: Occupational Hazards magazine, Cleveland OH, Sep 1993 p46

# Cut noise across the board

**The Swedish Worksafe Directorate has proposed that noise levels in the general work environment should be cut to 70–75 dB(A).**

In workplaces where concentration is required, such as offices, noise levels should not exceed 35 dB(A). These new limit levels will be applied in the construction and renovation of buildings, as well as purchase of new machinery.

The proposal includes suggestions for changes in the Swedish safety legislation. The study has covered all aspects of noise exposure in the community, and proposes the formation of a new noise commission. The commission will follow up all noise reduction activities in the industry.



Source: Arbetsmiljö 11, Sep 1993

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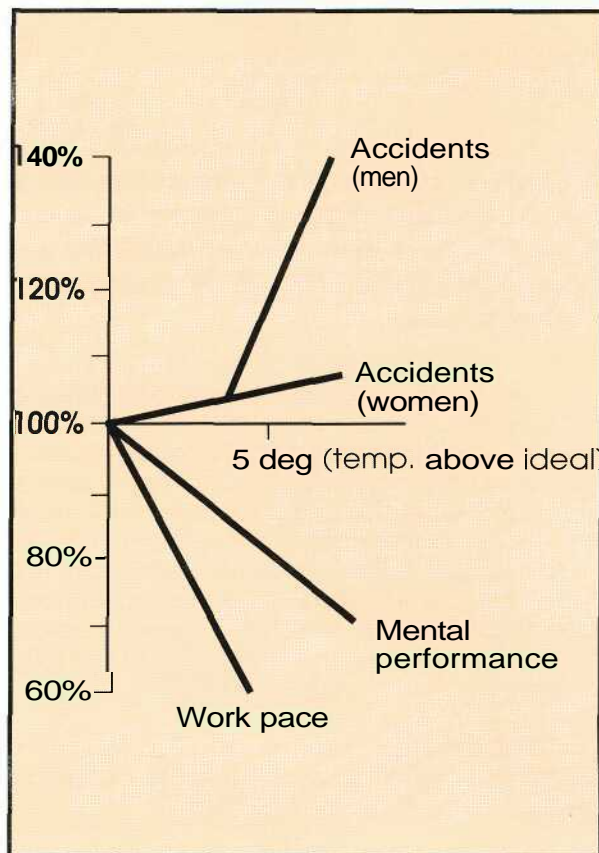
# A cool head pays off

Even a small increase in temperature above ideal working conditions can lead to a severe decrease in work performance and higher risks of accidents. A new study shows that by raising the temperature 5°C above the ideal level, the work pace falls by 60 per cent, mental performance falls by 20 per cent. The rate of accidents/mistakes rises by five per cent in women and 20 per cent in men.

These conclusions were drawn by Mr David Wyon, researcher at the Swedish Institute of Building and Construction Research.

Clearly, it really pays off to minimise excessive work temperatures.

By implication, these considerations become even more important in people who must wear personal protection and, in particular, breathing protection, since their body temperature is usually higher than normal because of the added stress on the body.



Source: Arbetsmiljö 7, June 1993 p46

# Sweden expands list of exposure limits

## 42 new substances and sixteen revised limits

*The Swedish National Board of Occupational Health and Safety has recently established exposure limits for 42 chemicals for which no limits were available previously. At the same time, the exposure limits have been lowered for sixteen other substances.*

The guidelines for exposure limits have also been revised in order to simplify materials handling or to clarify employers' requirements.

The most significant changes deal with permits when handling various hazardous materials (i.e. carcinogens which cannot be handled at all, and carcinogens which can only be handled subject to permission from the Swedish Work Inspection authority).

Permission to handle such substances is not given if a less hazardous chemical can be

used. Permission is only given if handling procedures and protection measures are satisfactory. Permissions may be accompanied with air sampling and medical screening requirements.

## Textile and paper dust

Most of the 42 substances added to the list are used in limited areas of industry.

Exposure limits to textile and paper dust are now in place (1 mg/m<sup>3</sup> for textile dust; 2 mg/m<sup>3</sup> for paper dust). Previously, the limit for organic dust (5 mg/m<sup>3</sup>) has been applied.

## Wood dust

Wood dust exposure has been lowered from three to two mg/m<sup>3</sup>. Even this exposure limit is likely to sink even further. Industries are advised that new plants or renovations should aim for an exposure limit of one mg/m<sup>3</sup>.

## Inorganic lead

The exposure limit for inorganic lead has not been changed. However, the authorities have advised that the intention is to lower the limit to 0.05 mg/m<sup>3</sup> regardless of particle size.

## Cadmium

Respirable dust has been lowered to 0.01 mg/m<sup>3</sup>.



Source: Hans Olof Wiklund, Arbetarskydd 9/93 p10

### **New chemicals:**

Acetamide  
Acctronitrile  
Allyl chloride  
Cyclohexylamine  
Diacetone alcohol  
Diethanolamine  
Diethylene glycol  
Di-isopropyl amine  
N,N-dimethyl aniline  
Dimethyl ethylamine  
Dimethyl sulphoxide  
Dinitrotoluene  
Dipropylene glycol monomethyl ether  
Disulphiram  
Ethanolamine  
Ethyl amyl ketone  
Ethylene glycol monobutyl ether acclate  
Formamide  
2-heptanone  
3-heptanone  
Isopropylamine  
Caprolactam

Catechol  
Chlorocresol  
Methyl acetate  
Methyl formiate  
Methyl isomyl ketone  
Monochloric acetic acid  
Nitroethane  
Nitromethane  
Nitrotoluene  
Paper dust  
Resorcinol  
Methyl mercaptan  
Dimethyl sulphide  
Dimethyl disulphide  
Sulphur hexafluoride  
Sulphur tetrafluoride  
Tetrabromoethane  
Tetranitromethane  
Textile dust  
Tiram  
Tiuramdisulphide  
Trinitrotoluene  
Ziram

### **Changed limits:**

Acrylamide  
1,3-butadiene  
Ethanol  
Ethylene glycol  
Ethylene glycol monobutyl ether  
2-hexanone  
Cadmium (respirable dust)  
Mercury (vapour & compounds)  
Manganese  
Benzo(a)pyrene  
Propylene oxide  
Tetrahydrofurane  
Trimellitic acid anhydride  
Wood dust  
Vinyl acetate  
Vinyl toluene

**PPM readers can contact PPM magazine for the actual limit levels.**

# When it comes to hearing, men are at a loss

*Jill Margo of the Sydney Morning Herald wrote in a recent article that when it comes to hearing damage, men show a markedly higher incidence than women.*

Men lose their hearing quicker and earlier than women, writes Jill Margo. A further complication is the unwillingness to recognise the hearing loss: instead of accepting the damage and trying to overcome it, men tend to hide the problem, straining to fill the gaps in conversations, and pretend that nothing is wrong. Consequently, they grow irritable and temperamental, and accuse others of mumbling.

## Disturbing survey results

A recent population study in Adelaide showed that 35 per cent of men between 45 and 60 suffered hearing loss. The corresponding figure for women was a mere 14 per cent.

An American survey showed the same results, concluding that twice as many men as women suffer hearing loss.

The deterioration of the hearing does not necessarily have to do with occupational noise exposure. In Jill Margo's article, Dr Ray Carroll of the Australian Society of Otolaryngology Head and Neck Surgery is quoted as saying that the nerve endings in the inner ear deteriorate with age. In men, this deterioration starts around the age of 55, whereas women have a longer lead period: the deterioration starts around the age of 68 in the female population.

## The first signs

The high frequencies are usually the first to be affected. Initial signs of hearing damage includes difficulties in following a conversation in a crowded, noisy room. Although the affected person can hear the voice of the conversation partner, it becomes difficult to focus on what is being said.



High frequency noise is the trademark of many consonants. Fricative sounds, such as "s", "sh", "f" and "th" start to lose their edge, and begin to sound the same. It becomes difficult to tell words apart, for example "fin", "thin", "shin" or "sin".

However, Dr Carroll claimed that you only need to understand 30 per cent of the words in order to work out 90 per cent of the conversation. But this constant straining and concentration takes a lot of effort and is tiring.

Guessing what another person is saying inevitably leads to embarrassing misunderstandings. However amusing such instances may be, they may ultimately become a social problem for the hearing impaired.

For instance, when asked if he remembered "to put the cheque in", the hearing impaired may reply "what chicken?"

## Consequences of hiding the problem

By refusing to acknowledge hearing loss, a person can ultimately isolate himself or herself. People may grow tired of having to repeat themselves constantly. On the other hand, by making wrong guesses and giving inappropriate replies, the hearing impaired may be labelled as stupid or strange.

## Why men?

The reason why men suffer hearing loss to a much greater extent than women, Jill Margo writes, is probably because men are exposed to more noise throughout their lives. Not only are men usually exposed to more noise at work, but also have noisier recreation activities, and often perform more noisy tasks at

home, such as lawn mowing and operating power tools.

Rough contact sports, such as rugby and boxing, can also contribute to hearing loss due to damage to the fragile hearing system.

## Cures and treatments

Surgery can repair many mechanical hearing problems. But if the nerve endings are damaged, surgery will have no effect.

Hearing aids only have limited use, and do not work for every type of hearing impairment. However, modern technology keeps resulting in ever better aids, such as directional microphones and selective noise suppression that can provide better contrast between a voice and background noise.

Certain "tricks" can be applied to enhance comprehension. For example:

- Lip reading
  - Interpretation of gestures
  - Awareness of facial expressions
- Moving away from background noise
- Communicating one to one
- Staying in well-lit areas for better visual contact

However, the first thing to do is to acknowledge hearing loss when it happens, and to seek medical advice. It is not until your hearing is improved that you realised how much you missed out on.



Source: Jill Margo, Sydney Morning Herald; "A loss well worth declaring"

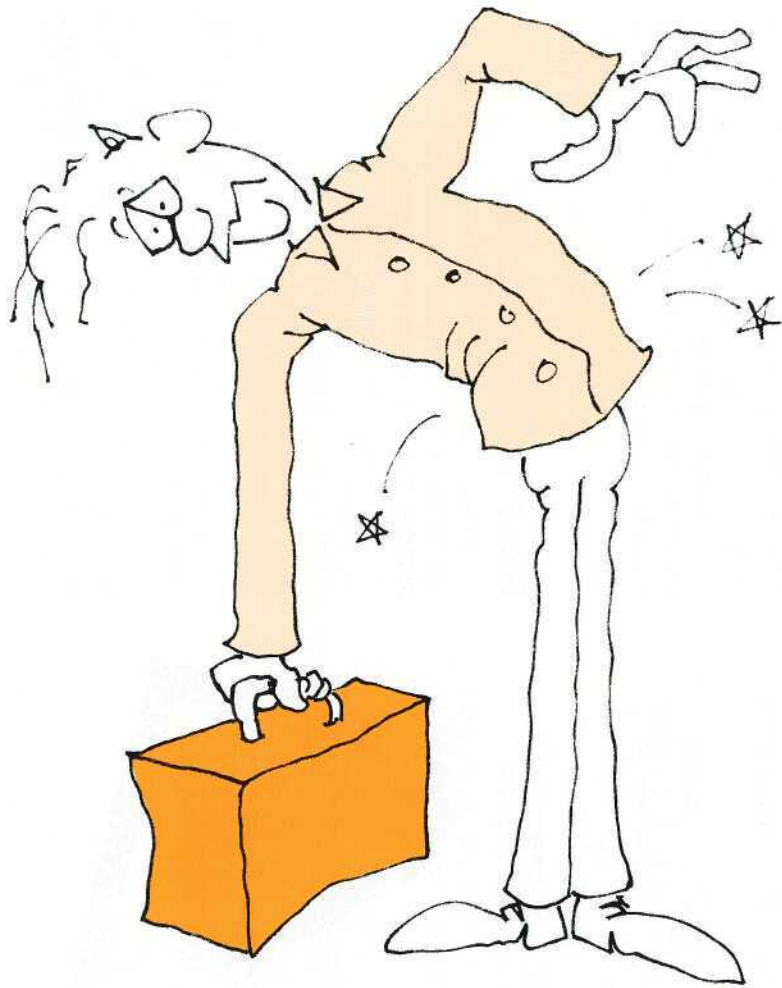
# Sound facts

- Even relatively low noise levels can create severe discomfort — so much so, that work routines might have to be corrected or repeated due to mistakes.
- Stressful noise affects not only our ears and our concentration, but also other parts of the body — often without our knowledge.
- Noise as low as 35 dB(A) is detrimental to work that requires concentration.
- Two out of three office workers work better and feel better if fans and airconditioners are switched off or turned down.
- Infra-sound in the 18—250 Hz range create more problems than even lower frequencies.
- Noise reduction pays. If the work performance is lifted by as little as once percent, noise reduction measures can normally be paid off in less than two years.
- Low frequency noise, varying noise and noise that contains clear tones is more disturbing than constant noise.
- Noise reduction solutions are often simple, inexpensive and effective, if they are based on quality knowledge and data.



Source: Tomas Åström, safety engineer; Arbetsmiljö 11, Sep 1993 p33





**Don't SWING**



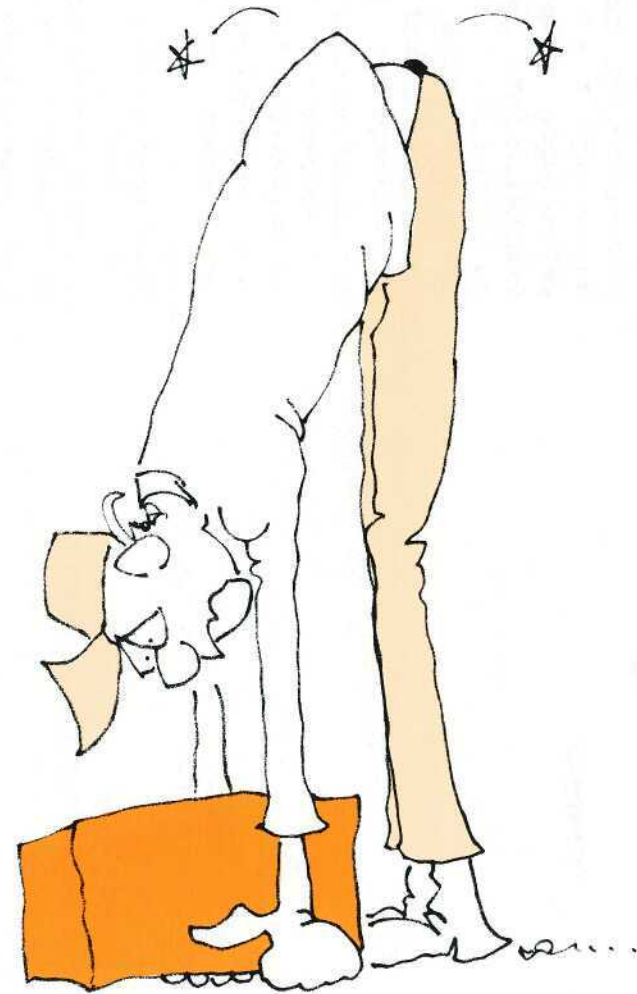
**Don't TWIST**



Good lifters  
use their HEADS — not their BACKS!



Don't REACH



Don't BEND



# SOLVENTS:

**Factors that affect the way your body absorbs—and gets rid of—solvents.**

*Solvents are absorbed into the body at various rates. The absorption rate does not only depend on the type of solvent and its concentration: there are many other factors that play part in the uptake of solvents. These factors should be borne in mind when assessing the workplace.*

Metabolism is the process by which our body gains nourishment from the food we eat and neutralises or expels toxic materials.

When we are exposed to foreign substances, such as solvents, the metabolic system starts to detoxify them. The detoxification process is very much dependent on the status of the metabolic system. Different people have different metabolism, depending on such things as eating habits, genetic factors, age, sex, illnesses, body build and so on. The absorption and elimination of a solvent of a particular concentration can therefore vary widely between individuals.

## Solvent mixes

It is rare that the work environment is contaminated by only one single substance. More commonly, several contaminants are present in the air.

We have already reported that a mixture of solvents affects the efficiency of gas filter respirators (PPM, Sep 1991, p10) and that, in effect, one solvent can "kick out" another solvent from the filter.

Solvent mixtures can also affect the metabolic system. Here are some effects of mixing solvents:

*Training is silver...  
Attitude is gold!*

SOLVENT 1	SOLVENT 2	EFFECT
Methylene chloride	Methanol	Increased carboxyhaemoglobin in blood
Ethyl benzene	m-Xylene	Inhibited metabolism of both solvents; lowered elimination through urine
Toluene	p-Xylene	Inhibited metabolism of both solvents
Carbon tetrachloride	Isopropanol	Increased toxicity of carbon tetrachloride
Benzene	Toluene	Inhibited metabolism of both solvents
MEK	m-Xylene	Inhibited metabolism of xylene

It is, of course, very difficult to assess the combined effects of all air-borne substances in the workplace. Moreover, research is scant when it comes to blends of various solvents, especially regarding effects on the human body (there is more information on animals).

## Solvents and alcohol

A large dose of ethanol (alcohol) has major detrimental effects on the metabolism of solvents. On the other hand, a small dose of ethanol can actually increase the metabolic rate.

Moderate alcohol consumption has a severely restrictive effect on the metabolism of toluene, xylene, styrene, trichloro ethylene, methyl ethyl ketone (MEK) and ethyl glycol ethers.

## Solvents and medications

Medical preparations can either stifle or stimulate the metabolism of solvents. For instance, the use of paracetamol (present in many headache pills and pain tablets) during exposure to toluene will lead to a higher concentration of toluene in the blood. Acetylsalicylic acid (also used in many common headache tablets) has an inhibiting effect on the metabolism of m-xylene. At the same time, the metabolism of the headache preparation is also inhibited.

The inhibiting effects can be significant: in the last example (acetylsalicylic acid + xylene), the metabolic rate for both substances decreased by 50 per cent.

## Genetic factors

Different people can be described as "slow" or "fast" metabolisers of various substances. It seems, however, that the metabolising rate depends on the type of substance. For instance, while two people might have the same metabolic speed of toluene, they may have a significant difference in the metabolism of methyl chloride.

Research is still very incomplete,

## Non-genetic factors

Hormone balance and illnesses can contribute to the ability or inability to metabolise solvents,

People who have been exposed to medicines, chemicals and pesticides often have the ability to metabolise chemical substances faster than others.

Other non-genetic factors include tobacco smoking, alcohol intake and diet, which can all affect the way the body deals with solvents.

## Body frame

The concentration of solvents in the fat depends on the body build. Slim people have a higher blood flow in their fat tissue than overweight people. The difference can be significant: in one study, the concentration of methylene chloride was found to be twice as high in slim people than in fat people — despite the fact that the total uptake of solvent was higher in the fat people.

However, it had been found that some time after exposure, fat people have a higher blood concentration of solvent than slim people.

## Sex differences

The concentration of solvents in the blood during exposure is probably higher in men, because women usually have more fat tissue. After the exposure, however, the situation is reversed, since the excretion of the solvent is slower in women.

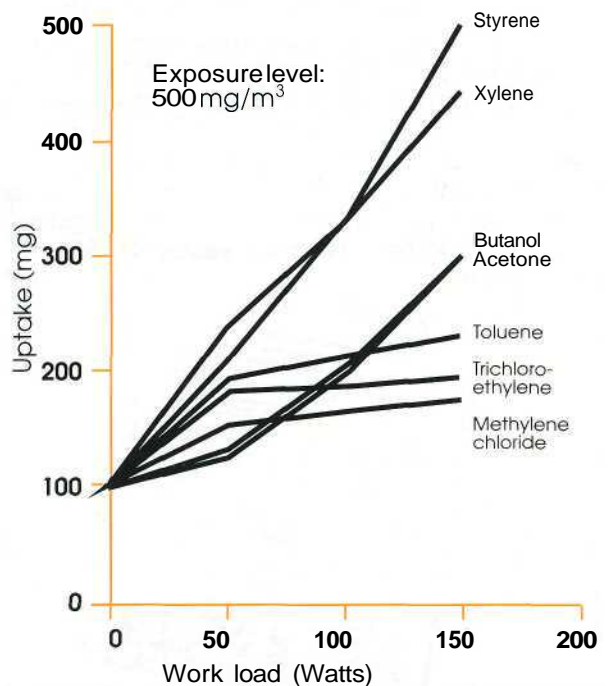
## Work load

It is commonly known that a higher work load means higher blood circulation. But the increase in blood flow only happens in the lungs, the brain, the nervous system, the muscles and the fat.

In fact, the blood flow through the kidneys, liver and stomach actually **decreases** with a higher work load.

Higher work load also means increased lung activity.

In short, physical activity leads to an increased absorption of organic solvents. The effects of physical work are most significant when the solvent is easily soluble in blood, and quickly metabolised. These substances are absorbed at ever higher concentrations, the higher the work load. The absorption of solvents that are less soluble in blood and tissue increases at light work, but soon reaches a level which changes little, even during hard work.



Styrene, xylene, butanol and acetone are very easily soluble in blood, and continue to be absorbed at higher rates as the work load increases. Toluene, trichloroethylene and methylene chloride are less soluble, and reach a "stable level" at relatively light work.

## In conclusion

The differences in the effects of solvents between individuals are a major problem in exposure analysis. Often, this difficulty means that exposure to solvent is assessed on a group or average basis, and not at an individual level.

Some factors should be taken into consideration for each individual worker. For instance, ethanol intake (because of the inhibiting effect on the metabolism), body fat, the use of medications and, most importantly, work load.



Source: Agneta L6f, "Faktorer som påverkar upptag och omsättning av lösningsmedel i kroppen", Arbete och Hälsa 1992:21 pp39-60

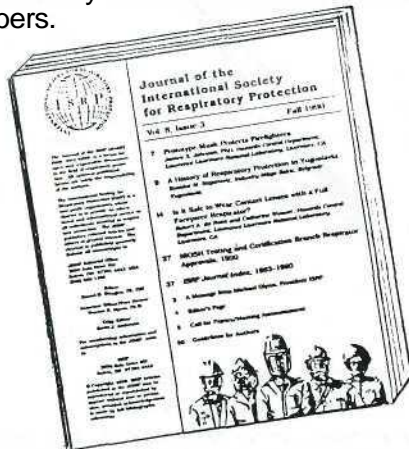
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# International Society for Respiratory Protection

The International Society for Respiratory Protection is currently inviting interested people world-wide to join this growing organisation. The Society is made up of professionals whose interests and expertise lie in the area of respiratory protection. The Society acts as a forum of mutual discussion, information, education and problem-solving on a global basis. The current membership includes safety professionals from over 20 countries. The ISRP head office is in Jonesborough, Tennessee, USA.

All members of ISRP receive a quarterly journal with a wide range of articles, both reviewed and non-reviewed, on all facets of respiratory protection. Members receive the journal as part of their membership fee. The journal is published in the United States, and invites submissions of articles from all members. A journal library of all back issues is available to members.



Further activities of the International Society for Respiratory Protection include a biennial conference, which is held at various places around the world. The 1993 conference took place in Tokyo, Japan, and the next planned event, in 1995, will be staged in Vancouver, Canada.

In order to enable both local and global communication, this truly international organisation is divided into several regions, known as "National Sections", i.e. European, Japanese, North American and Other sections.

The Society comprises several technical committees whose role it is to address specific aspects of the respiratory protection, such as:

- Respiratory protection for fire fighters
- Psychological effects of respirator wear
- The Physiology of respiratory protection

As a member of the Society, you will have a valuable means to communicate with fellow professionals around the world interested in respiratory protection.



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Australian section  
Private Bag 1001  
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\_\_\_\_\_

If accepted as a member, I will abide by the bylaws of the Society.

Signed: \_\_\_\_\_



Show your talent in

# Our annual Christmas Competition!



**This year, we invite readers of PPM to write their own Handy Hint.**

There are no specific rules, as long as you try to write a Handy Hint that is:

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- **Short and snappy**
- **Not too specialised**
- **Easy to remember**
- **Conducive to a safer work place**

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So get cracking! Let your creative juices flow. Use the coupon on this page, or supply your entry on a photocopy. And please remember: **we need the entries by the 1st of February 1994.**

## Handy Hints

**Here's my Handy Hint:**

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and a Happy New Year!**



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