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IMPORTANT

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W.A. GOVT. BLITZ ON PAINT SHOPS

The West Australian government is staging a blitz on paint shops after a British report warning that painters run a greater risk of contracting cancer. That is the message in an article in the Perth-based newspaper, The West Australian.

The British research had found a clear connection between painters and several kinds of cancer. In fact, the report stated that painters stood a chance of contracting lung cancer 40 times greater than the average person. The incidence of cancer generally among painters were 20% above normal. Spray painters were also found to be more likely to have cancer of the testicles.

The report has worried WA painters and the Department of Occupational Health, Safety and Welfare. To combat the problem, paint retailers would be checked for adequate advice and printed information material on the hazards of paint. Although retailers are obliged by law to warn customers of the hazards, this was often not done, according to the article.

Professional painters were better protected by strict safety regulations. However, home handymen and hobby painters were less aware of the hazards.

Ms Janis Baily of the Operative Painters and Decorators' Union said that workers had been concerned for some time about hazardous chemicals. The union's answer was to employ a full-time researcher to identify dangerous substances in paint.

Building unions have said that paints containing the identified compounds would be banned and, presumably, replaced with less hazardous products.

Source: Brendan Nicholson, The West Australian, 03 Aug 1989.

IN THIS ISSUE:

"PREVENTION PAYS" SEMINAR

BACK PAIN costs the Australian industry some $255 million per year in workers' compensation pay-outs, and is out of proportion with all other types of injury. If you take into consideration consequent factors, such as less productivity, greater staff turnover and industrial relations problems, the figure could rise to as much as $600 million.

Another great loss to the industry and its workers is sickness due to chemicals. The proportion of workers affected by hazardous chemicals could be as high as 10 per cent.

Migrants with a limited knowledge of English are worst hit by these problems, mainly because their knowledge of risks and prevention is generally low due to poor communication.

PREVENTION PAYS is a one-day seminar that seeks to establish effective ways of communicating the problems and their solution to workers with English as a second language.

The seminar comprises both lectures and small-group workshops, and will be of great benefit to health and safety committee members, employers of migrant workers, and other people in the safety field.

The seminar will be held from 8:30 to 4:45 on **Thursday, 02 Nov 1989 at the Masonic Club, Parramatta.** Tickets are $20.00.

To reserve a seat, please call Doug Micovic on (02) 895 8632.

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Handy Hints

Two reasons to avoid an ear muff that's TOO EFFECTIVE:

1) Too much attenuation creates a sense of isolation

2) Communication between workers is impossible, and the wearer removes the muffs to hear

Handy Hints

EXTINGUISHER ON FIRE!

ALWAYS make sure you've got the right fire extinguisher — the wrong choice might help spreading the fire or intensify it.

Find the most suitable extinguishers for the materials you're using.

CHEWING THE FAT ON EAR PLUGS

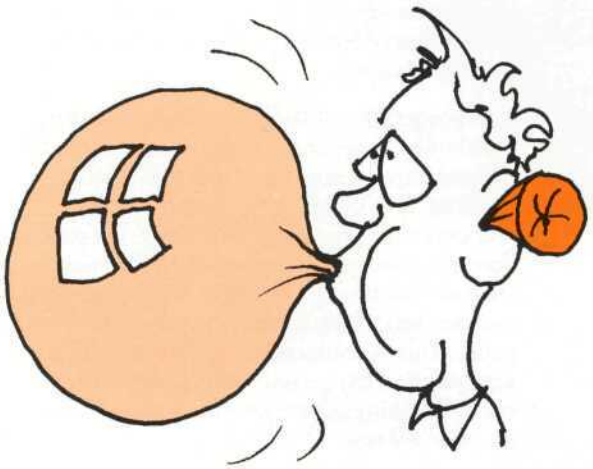
Recent studies indicate that ear plugs provide much less protection in "real life" than under laboratory conditions. There may be three distinct reasons for this:

- The user may not know how to insert the plug correctly
- Individual build of the ear canal may prevent proper insertion
- Head and jaw movements work the plug loose over a limited period of time

A recent American survey set out to explore the stability of ear plugs as a function of jaw movement. After all, the jaw is rarely static: you talk, give instructions, chew bubble gum, yawn, cough, grit your teeth and otherwise move the jaw during work. So what does this have to do with ear plugs? Jaw movements cause the ear canal to change shape, and repeated jaw motions may cause the plug to dislodge.

CHOOSE WHO CHEWS

23 young adults (mainly women) from the speech and hearing classes at the Arizona State University were selected for the test. Each individual tested five different brands of plugs (Bilsom Soft, Corn-fit, 3M-6300, Pura-foam and E.A.R.). The test involved chewing bubble gum for thirty minutes without adjusting the ear plugs. After an initial hearing test without plugs to establish that all test persons had normal hearing, they were then tested before and after the 30 chewing minutes with the plugs inserted. Yet another reference test was conducted without plugs after the experiment.



RESULTS

There were significant differences in the stability of the various ear plugs. Some of them even fell out during the test!

It was established that a good ear plug should have the following characteristics:

- Exerting pressure perpendicular to the walls of the ear
- As large area as possible between the plug and the ear canal
- Coarse surface
- Compatible with the texture of the ear canal wall
- Resistant to lubricants, such as perspiration and ear wax

The report stresses that the experiment was not conducted to show which ear plug is "better" than the others. However, the test shows that education in how to fit the plugs is important, and that certain plugs will have to be re-rolled or pushed in more frequently than others.

KEEP AN EYE ON YOUR EARS

The attenuation (noise absorption) of an ear plug depends on how it sits inside the ear canal. If you suddenly remove or loosen the plug, you'll immediately sense the difference. However, a plug that gradually lets more and more noise through may not be easily detected. Therefore, it is important to remind workers to re-insert or exchange their plugs at more or less frequent intervals, depending on the brand used.

CONCLUSION

The tests indicated that the greatest stability was attained by self-expanding viscose foam protectors. Flanged plugs and glass- fibre plugs were found to be more sensitive to jaw movement.

PLEASE NOTE: We have not displayed product-specific information in this article. People interested in how the various brands fared in the test should refer to the original source.

Source: Gordon L. Cluff, Dept. of speech and hearing science, Arizona State University— American Industrial Hygiene Association Journal, vol. 50, no. 3, March 1989

SAFETY TRAINING CAN BE HAZARDOUS TO YOUR HEALTH!

SAFETY TRAINING PROGRAMS come in all shapes and forms, spanning from the home-made "cut, glue and photocopy" schemes to hi-tech video productions and computer programmed slide shows. Yet, the simplest program may be just as effective as the most elaborate. The following light-hearted look at training tells of some major pitfalls.

HAZARDS

The three main hazards in devising a training program are Complexity, Inflexibility and Interminability.

Complexity

- **Cause:** The information concentration is at a dangerously high level — well over the threshold limit value that's bearable for normal human beings. Tell-tale signs include large tomes of tightly typed copy, hour-long slide shows and, if there are any overhead visuals, there are hundreds of them, and they all look the same.
- **Symptoms:** Excessive fatigue. Confusion. Headache. Those hardy employees who somehow manage to sit through the entire training session end up with a knowledge of next to nothing about almost everything.
- **First aid:** Major revival attempts are essential. Clear the program from any extraneous material. Administer fresh air. Most importantly, eliminate the congestion of information. The program should be distilled and boiled down to an essence.

Inflexibility

- **Cause:** The training program dates from somewhere around 1956, but nobody knows exactly when it was made, or who made it. It worked then, and it should work now. Therefore, the same program is shown over and over again to all employees, whether they are fork-lift operators, welders, storekeepers or typists.

- **Symptoms:** Prolonged and repeated exposure results in total mental paralysis. Staff enter the training room carrying the only personal protection available: magazines, cross word puzzles, "The Best of Irish Jokes" books and Sony Walkman headsets.
- **First Aid:** Evacuate the training room. Thoroughly disinfect the program through incineration. Make sure no trace remains of the old program. Replace with more effective, less hazardous material.

Interminability

- **Cause:** The training program does not feature a safety shut-off. Although the training program is effective in small doses, the time-weighted value is exceeded, and staff are subjected to prolonged exposure.
- **Symptoms:** Initial symptoms include general discomfort, fidgeting, inability to concentrate, making paper aeroplanes from the training material, and cleaning fingernails on the corners of the note pad. Eventually, the patient becomes susceptible to outside stimulation, such as counting the cracks in the ceiling, being mesmerised by the pattern of the carpet or wall paper. This is compounded by a certain kind of asphyxiation expressing itself in the form of excessive sighing, yawning and, in severe cases, unconsciousness.
- **First Aid:** Discontinue training as soon as the limit is reached (about 30 minutes). Instead, administer information in small doses at regular intervals. This assists absorption through the brain.

TRAINING ADVICE FROM AMERICA

Wayne A. Johnson is director of safety at the large American Dial Corporation, and is responsible for the training and instruction of some 4,500 employees in a wide array of professions.

Mr. Johnson's experience takes in countless success stories, and a few memorable failures, such as the paint operation where workers were required to wear respirators because of the vapours.

Despite intensive training in the benefits of personal breathing protection, one veteran painter flatly refused to wear a mask. Only when the safety officials put the pressure on did he relent. However, the painter cut a hole in his respirator to make room for a cigar, which he chewed while working.

Mr. Johnson does not divulge the eventual outcome, but the painter was told in no uncertain terms that "either he or his successor" would wear the gear properly.

Wayne Johnson has a number of suggestions for training personnel when selecting or devising a training program:

- **Written pre- and post evaluation** from the workers is a good idea to gauge the attractiveness and effectiveness of the program.
- Workers are **"volunteer learners",** i.e. they will probably retain their jobs even if they don't learn anything. To make learning attractive, the program should be interesting, and the audience should be rewarded for taking part.
- **Use more than one medium.** Different people learn in different ways. A smooth blend of written material, audio-visual material, demonstrations, work shops, quizzes etc. make an effective program.
- **Keep the duration down to 30 minutes or less.**
- **Be relevant:** do not include segments that aren't directly connected to the audience.
- **Know what you want to accomplish, and** stick closely to the subject without deviating.
- If purchasing a ready-made program, **make sure the program relates to the particular industry,** or that there is a facility to include industry-specific material.
- **Be positive.** Scare tactics don't work. "This could happen to you", has a negative, short-lived effect.

Source: Gregg LaBar — Occupational Hazards magazine, Cleveland, Ohio, 9/1989

a thick-headed painter in Sydney
said "solvents can't damage my kidney"
he sniffed TDI,
and benzene and tri,
He soon lost his kidney, didn't he.

HOW LOUD?

Do you know the level of the noise you're hearing? Remember that any noise above 85 deciBel may be hazardous to your hearing, even if it only lasts for a short while.

Compressor	101—123
Blaster	107—120
Mining drill	108—113
Air gouger	105—115
Abrasive cutter	100—115
Diesel generator	107—111
Gas turbine	92—112
Metal saw	105—108
Impact wrench	104—107
Revving truck	100—102

Cross cut saw	98—101
Welding machine	99—100
Router	98—100
Brake rivetter	97—99
Profile cutter	95—98
Blower/pump	95—96
Wood plane	94—96
Band saw	94—95
Prime mover	90—94
Crusher	89—94
Back hoe	82—94
Belt sander	82—92
Restaurant	40—50
Office	30—40
Class room	20—30

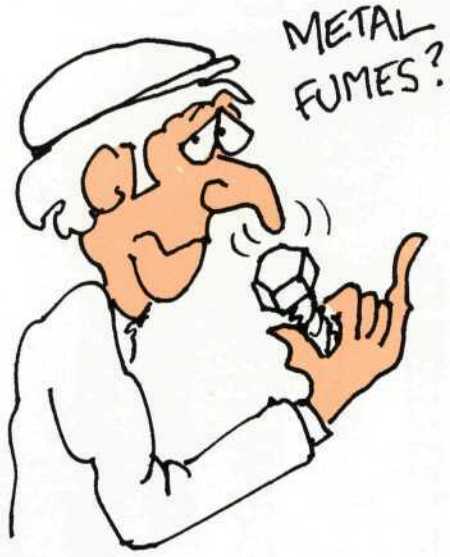
WELDING

EXPLORING THE HAZARDS

Welding can be broken down into two main types: (a) fusing the metal pieces directly under very high temperature, and (b) joining them by using an additional metal as a kind of "glue".

The actual techniques number over 80 different processes, Shielded Metal Arc Welding being by far the commonest, followed by Gas Metal Arc, Gas Tungsten Arc and Oxy-fuel Gas Welding. More than 50% of all welding jobs are performed using Shielded Metal Arc Welding.

During the welding process, certain health and safety hazards may be present in the form of metal fumes and gases.



METAL FUMES

- **Aluminium** has until recently been regarded as a harmless substance. However, new research points to health problems in welders who are exposed to the metal (see special article elsewhere in this issue).
- **Cadmium** occurs in some alloys. It may also be part of the coating of the welding electrode, or in other protective coatings. Cadmium can cause serious pulmonary irritation and oedema (fluid in the lungs). Chronic effects are emphysema and kidney damage. Cadmium fumes should be avoided at all cost.
- **Chromium** is used as an alloying agent in stainless steel. Prolonged excessive exposure to chromium may result in skin irritation and a greater risk of lung cancer. Welders may also become sensitised to chromium, and develop eczema when exposed to small amounts.
- **Copper** is found in many alloys, such as monel, brass and bronze, as well as in welding electrodes. Copper can cause respiratory irritation, nausea and metal fume fever.
- **Fluorides** are present in some electrodes and in flux. Long-term exposure to very high concentrations may cause bone changes and joint deterioration. Milder excessive exposure may have chronic effects such as pulmonary oedema and skin rashes.
- **Iron** is a very common constituent in welding fumes. Acute effects include respiratory irritation. Iron is also capable of causing siderosis, fibrosis of the lung.
- **Manganese** is used in most stainless carbon alloys and welding electrodes. Welders are unlikely to be exposed to hazardous concentrations, but small amounts of manganese may contribute to fume fever.
- **Lead** is found in solder, brass, bronze, and is also used as a metal primer and steel coating. Welders are very unlikely to show any acute effects. However, blood testing should be carried out to established elevated levels of lead. Chronic effects from accumulated lead in the blood include anaemia, fatigue, abdominal pains, reduced fertility, kidney conditions and nerve damage.
- **Molybdenum** can cause respiratory irritation and impaired breathing, but welders are unlikely to be exposed to excessive amounts.
- **Nickel** is found in many alloys and stainless steel (monel, inconel, incoloy, for instance). Eye and throat irritation are acute effects. Scientists are currently disagreeing on whether nickel compounds are capable of causing or promoting cancer in welders.
- Tin is present in some bronze alloys and solders. Tin fumes are known to cause stannosis, a form of pneumoconiosis but it is improbable that soldering work could place the worker at risk.

WELDING

- **Titanium** fume is found in stainless steel, alloys, flux and coatings, but is not known to have any ill effects in welders.
- **Vanadium** is present in certain alloys and welding electrode coatings. Acute symptoms are eye and respiratory irritation. Chronic conditions may comprise bronchitis, rhinitis, pulmonary oedema and pneumonia.

GASES

- **Ozone** is formed when air is exposed to ultraviolet radiation, as happens in the welding arc. Ozone may be very detrimental to health, causing pulmonary congestion, oedema, and haemorrhage. Minute concentrations of about 1 ppm — even for short periods — dry out the eyes and cause headaches. Prolonged exposure may result in severe changes in lung function.
- **Nitrogen Oxides** (NO2 and NO) can cause eye and throat irritation at 10-20 ppm. Higher concentrations may result in pulmonary oedema and other sever lung conditions. Fortunately, welders are unlikely to sustain chronic poisoning.
- **Carbon Monoxide** is colourless and odourless. The gas is an asphyxiant, causing headache, dizziness and confusion.

DECOMPOSITION

Decomposition products may also be hazardous to health. Solvents used to clean and degrease metal before welding may release toxic gas when welding starts. These gases include:

- Phosgene
- Phosphine
- Hydrogen chloride
- Chloroacetic acids
- Acrolein
- Formaldehyde
- Acetaldehyde
- Teflon welding (thermoplastic welding) may also include several dangerous gases, such as carbonyl fluoride, hydrogen fluoride and perfluoroisobutylene.

Out of these substances, phosgene may warrant a particular mention. Phosgene is formed through the decomposition of chlorinated hydrocarbons (trichloroethylene, perchloroethylene) which are quite common degreasing agents in places where welding is carried out. Metal inert gas welding electrodes are particularly prone to create high concentrations of phosgene. Normal welding is unlikely to cause excessive amounts, but care should be taken to keep these substances well away from all welding work.

SMOKING AND WELDING

Welders who are smokers are likely to be more severely affected by welding fumes.

CONCLUSION

Evidence suggests that welding is not a particularly hazardous occupation — provided the welder is appropriately protected from the various fumes. General ventilation, local point exhaust, and personal respiratory protection all serve to remove the worker from the potential hazard. The table on page 12 may be useful for welding operators.

Source: W. K. C. Morgan, University Hospital, London, Ontario, Canada — American Industrial Hygiene Association Journal vol. 50, no. 2, Feb 1989 (pp. 59-69); Am. Health & Safety Assoc. — Welding Health & Safety Resource Manual, Akron, Ohio 1984; Black's Medical Dictionary, London 1987

WELDING

WELDERS RISK INFERTILITY

Welders are running 100% greater risk of being childless, according to Danish reports. Childlessness hits 10 per cent of all men and women.

Welding, especially work on stainless steel, can reduce the quality of the semen. The threshold limit values for welding fumes are exceeded in more than half of all surveys, according to a Danish research project.

Aarhus university has conducted a survey including 3,100 men who have tried unsuccessfully for more than a year to have children. The risk of having substandard semen quality was doubled in welders compared to other professions. The most affected group were stainless steel welders, showing an added risk of 2.3 times normal. The sperm deviated in quantity, appearance and mobility.

An earlier report from Odense in Denmark shows that welders generally had children later than others. Two other reports from Aalborg show reduced semen quality in welders. A fourth project from Denmark displays a lower semen quality in welders who are most exposed to welding fumes than in less intensely exposed welders. The effects were pronounced even at exposures below the TLV.

Yet another research program is underway to establish any connection between welding and spontaneous abortions and deformations in the foetus.

A report from the 70s pointed to the TLV being exceeded two times out of three at Danish wharves. Later studies have found excessive concentrations in three out of every four cases of electric welding, and in 60% of gas welding projects.

Chromium in the urine

"It all looks like substances present in the welding fume can be transported to the testicles through the blood. One survey showed that welders have double the amount of chromium in the blood", says Jens T. Mortensen, physician at the Institute of Social Medicine in Aarhus. Mr. Mortensen is the main force in the latest report.

Apart from various gases, welding fumes may also contain particles of iron, manganese and cancer producing nickel and chromium compounds. Moreover, small amounts of molybdenum, vanadium and copper may be present. Metals that are known to damage the reproductive system, such as lead and cadmium, as well as phenol, may be present in surface treated materials. Some of the metals have proved to cause genetic damage in animals.

Is heat a risk?

The Danish report at hand shows that, in addition to welding, the risk of reduced semen quality is increased in the following work areas:

- Building and construction, especially in heating, water, panel beating and painting.
- Iron and metals industry, especially electricals and car manufacture.
- Office and administrative work (heat?)

"We wish to point out, however, that the semen quality normally varies greatly from male to male", says Jens P. Bonde at the Institute of Social Medicine, Aarhus, Denmark.

Sperms getting worse and worse?

Involuntary childlessness affects about 10 per cent of all couples. Infertility clinics have established that the cause is in the male as often as in the female.

WELDING

The female's egg is fairly well protected from external substances up until the fertilisation stage. However, damage from isolated large doses of chemicals or chemicals that have accumulated in the body (such as lead) cannot be ignored.

During the 1980s, more interest has been directed to the reproductive ability of the male. The man's sperm cells are constantly regenerated, and are largely unprotected from foreign substances carried by the blood for about two months.

It is suspected that the sperm quality in Scandinavian men — appearance, mobility, quantity and genetics — has deteriorated during the last decades, however, this has not been proven.

Source: Börje Nenzén, Arbetsmiljö, 7/1989; Jens T. Mortensen, Scandinavian Journal of Work Environment & Health, 14/1988

New findings:

WELDING FUMES MAY CAUSE BRAIN DAMAGE

Welding fumes containing aluminium, manganese or lead are suspected to cause brain damage. This is the disturbing result of a recently completed research project conducted by the Swedish Work Safe Institute.

Aluminium is absorbed and stored in the human body, and could cause severe brain damage. In the mid-70s, researchers discovered that aluminium poisoning caused dementia in dialysis patients. Moreover, British scientists are currently discussing whether aluminium has something to do with Alzheimer's disease.

Lung Cancer

From earlier research, we know that aluminium welders have 100 times higher level of the metal in the urine than the general population. The substance stays in the body for a relatively long period. The biological halving period of aluminium is about six months or longer, says Bengt Sjogren at the Swedish Work Safe Institute — one of the researchers behind the recent findings.

"So far, no-one has established whether the aluminium also affects the nervous system in welders", he says.

Nervous system effects

The scientists conducting the new study wanted to establish whether welders who had been exposed to aluminium and other metals for long periods displayed any symptoms in the nervous system. These complaints could possibly be explained by exposure to metal fumes.

"We found several nervous system disorders in welders who had been working for more than 13 years", says Bengt Sjogren.

"However, we have no absolute confirmation. More research is needed, including psychological testing. Still, our research clearly rings a warning bell".

There are Threshold Limit Values for aluminium, set according to the effects on the lungs of welders. The welders who took part in the survey had probably been exposed to higher levels of metal fume than the current TLV, claims Mr. Sjogren.

The project also included welders who had been exposed to manganese and lead fumes.

Both of these metals have been known to be neurotoxic (damaging to the brain) for a long time. This part of the study included welders from the Swedish State Railways,

who generally work outdoors. These welders, too, showed significant effects on the nervous system.

The most disconcerting finding was a degradation of brain functions in workers who had been welding manganese steel for a relatively short time (about three years). Furthermore, these people had been working outdoors most of the time, in locations where, presumably, the ventilation was adequate.

"Manganese is a well-known neurotoxic metal, and the TLV is set according to the hazardous effects on the nervous system. Yet, our results point to damage in welders", says Bengt Sjögren.

"Our results must be regarded as warning signals, and our explorations must be continued. Moreover, the TLV for manganese should be reviewed."

Source: Nora Weintraub, Arbetarskydd 4/1989 (Newspaper of the Swedish Work Safe Directorate).

WELDING PROTECTION GUIDELINES

This chart was published by the American Industrial Hygiene Association to aid welders in the selection of protection.

Naturally, general ventilation and effective exhaust are the desired ways to avoid fumes.

However, in enclosed areas, or other areas where fume concentration is high, personal respiratory protection is the best solution.

Protection Guidelines for Some Welding Processes

Welding Process	Shop Welding		Field Welding	
	Ventilation Good: Exhaust vent is used to capture fumes and gases	Ventilation Poor: Vent cannot be used due to physical or process restrictions	Ventilation Good: Open area spark enclosure, or inside vessel with excellent air movement	Ventilation Poor: Spark enclosure or inside vessel with poor air movement
Shield Metal Arc Welding — Carbon steel	Not required	Not required	Not required, except for galvanized	Fume mask required
Shield Metal Arc Welding — Other alloys	Not required	Fume mask required	Not required, except for galvanized	Fume mask required
Arc Cutting or Gouging	Arc cutting in shop not recommended; see field welding requirements		Fume mask required Except for open plant areas	— Air supplied respirator — Helpers to wear fume mask (minimum)
Oxy-Acetylene Torch Cutting	Not required	Not required except for galvanized		— Air supplied respirator required
Plasma Arc Cutting	Air supplied respirator required for all plasma arc cutting			
Gas Metal Arc Welding	Not required	Air supplied respirator required	Not required	Air supplied respirator required
Gas Tungsten Arc Welding	Not required	Air supplied respirator required	Not required	Air supplied respirator required

NOTE: This table is an illustration of one approach to respirator guidelines. Each location may wish to develop guidelines based upon prevailing conditions and exposures.