Do your brains in?

The EU Government names 'chemical neurotoxicity' in its top ten list of workplace diseases(1) Denmark pays affected workers state pensions for 'solvency dementia'.(2) In the UK, the two million workers regularly using organic solvents are neither warned of the risk nor compensated.

The result? Up to 10,000 cases of solvent induced brain damage every year.

What's going on in your head?

Solvents attack the brain: they dissolve in the fatty sacs containing the nerve cells. In some cases this will actually kill the cell, in others, make it "leaky". These cells (like any blood cell) will communicate with the electrical messages they are designed to receive.

Health effects

In 1985 working groups in both the USA(10) and Denmark(11) devised schemes to describe solvents, based on central nervous system (CNS) disorders. The groups were in broad agreement on the stages of development of these disorders, from minimal and reversible changes, up to pronounced and irreversible.

- **Type 1.** Organic afffective syndrome. Fatigue, memory impairment, irritability, difficulty in concentration, and mood disturbances.
- **Type 2.** Mild chronic toxic encephalopathy. Sustained personality or mood changes (eg emotional instability, loss of motivation), weakness, also develop poor concentration, memory and learning capacity.
- **Type 3.** Severe chronic toxic encephalopathy. Overall deterioration in intellectual and memory functions (dementia) that may be irreversible, or at best, only poorly reversible.

It used to be thought that only "solvent abusers" developed the most severe Type 3 condition. Evidence now confirms, however, that occupational exposure can cause permanent brain damage. "This damage seems to be a result of that alcohol and may be described as a premature ageing of the brain", revealed the author of a major review on mixed solvent exposure and brain damage(2).

Psychosis

Long term low exposures or short term high exposures to solvents can produce all the symptoms normally associated with psychosis (e.g. delusions, loss of touch with reality). Recovery is not guaranteed, even after exposure has stopped.

A 1989 study of 22 men with mixed solvent exposure concluded that the test results were almost identical in severity and symptomology to that of a group of former World War II prisoners of war and compared the symptoms to those of post traumatic stress disorder(2).

A study of women working in a US missile electronics factory found nervous system damage resulting from solvent exposure. The women who worked with solvents reported symptoms indicating neurological effects more frequently than those who were not exposed. The symptoms were depression, severe headaches, lightheadedness, feelings of the room spinning and tremors. The concentrations of solvents measured in the workplace were below the US exposure limits(10).

Typical symptoms

Memory loss; poor concentration; deterioration in brain power; easily tired; loss of initiative; mood changes; anxiety; nervousness; emotional instability, after a time, print books, papers, scissors and TV programmes blurred (cerebral atrophy).

Accidents

Single, large solvent exposures can cause brain damage. A worker at SKF-Dornell: a large engineering firm in South Yorkshire, was killed by fumes after a spill of trichloroethylene in 1985. The spill led to SKF being prosecuted and fined £1,500. The worker paid a heavier price, however, in his symptoms, and in 1988 he told Hazards: "I fall asleep at dinner. My memory is shocking. I have to write down anything I want to say or remember otherwise I panic" (Hazards 19, July 1988). Even now he is still not back to full health.

Other effects

Recent evidence suggests that solvents attack the active part of the brain. Dr David Ray of the Medical Research Council announced in July 1992 that his team had found "an interaction between noise exposure and the severity of brain lesions produced by exposure to chemicals." He warned that his findings could have profound implications for protecting people working with neurotoxic chemicals since they suggest that noise exposure could increase sensitivity to chemicals in the brain.

This is no more than you might expect - more blood is directed to the most active working cells. If the brain is loaded with solvents then it will be these cells that suffer the worst damage.

Law

Control of Substances Hazardous to Health Regulations 1988.

- **Assessments (Regulation 6)**: employers must assess the hazards arising from the use of substances - ensure the assessment contains details of toxic effects.
- **Control exposures** (regulations 7, 8, 9): if safer alternative substances are available they should be used. The print union GPMU is following the lead of German and Danish trade unions, arguing nationally for the substitution of solvent based inks and washes with safer alternatives.
- **Health surveillance** (Regulation 10): employers should investigate possible causes of ill health of their workplace. Have they taken account of the toxicological effects of solvents?
- **Information** (Regulation 12): not just which substances are used and how, but what alternatives were considered and why they were rejected.

Management of Health and Safety at Work Regulations 1992 (effective from 1 January 1993)

- **Information** should be provided to all employees in an understandable form on the results of risk assessments, the preventative and control measures to be taken, and on emergency procedures.
- **Employees** have the right to stop work and proceed to a place of safety if "exposed to serious, imminent and unavoidable danger." Compenation

DSS: Solvent dementia is not recognised by the government as a prescribed disease, with the possible exception of "central nervous system dysfunction and associated gastrointestinal disorders" caused by exposure to chloromethane. There are possible routes to a DSS pension for other solvent exposures however: Poisoning by carbon disulfide, benzene, toluene, xylenes or trichloroethylene is covered. Toluene exposed shopfitter worker Joe Watts won a disablement pension after his exposures left him with a 40% disability which included mental confusion (see Hazards 31, December 1990). Damage to the nose, throat and lungs caused by carbon tetrachloride or trichloroethylene is covered. Peripheral neuropathies caused by n-hexane or methyl n-butyl ketone is also eligible for DSS benefit.

Common law

It's very difficult to get compensation for any condition that has a gradual onset. Ensure you keep detailed records of substances used, exposure levels, accidents/incidents, and who was exposed. Also keep a log of the health surveillance findings (you can demand these at safety committee meetings) and do your own surveys periodically to provide believable evidence.

Warning signs

Workers should be vigilant for any symptoms of solvent exposure. Even if short term exposure doesn't kill you - it can - it is an early warning of possible long term problems. Better still, get rid of the chemicals and both short and long term problems with them.

In June 1992 Camden Council was fined £10,000 after admitt- ing three breaches of the COSHH Regs. Former Camden manager Paul Reay, 25, suffered temporary blindness, hallucinations and hallucinations affecting the liver to give solvents. Liam had been attaching plastic washings with a drying agent for a day without effect. On the second day however, the symptoms forced him to stop work. 'He had, in effect, been slowly snuffing glue for a day and a half.' HSE inspector Matthew Nealon told the court. The Council admitted failing to carry out suitable and sufficient COSHH assessments, failing to provide adequate control measures and failing to adequately train staff in the use of hazardous substances.

Lessons from Denmark

Since 1976 the Danish Government has taken "solvency dementia" and its industrial diseases. To date our National Social Security Office has handled over 4,500 sufferers. Solvent users in Denmark, declined, with alternatives hav- ing been introduced in paints, were suffering from the health service and other sectors. This has led to a dramatic fall in the number of cases of solvent dementia, from 1,500 in 1984 to abou 100 in 1993.

Trade union action

It wasn't an act of insipid benevolence that led the Danish government to recognise solvent dementia as an industrial disease in 1976. The pressure started back in the 1960s when the Danish Printers' Union first sus- pected a link between solvents and brain damage and demand- ed compensation for affected mem- bers.

In the UK, some unions have already started to build on the lessons of their European counterparts. The TGWU branch secretary at a Yorkshire confectionery firm was concerned when members com- plained of headaches and dizziness - solvent-based inks and thinners were used on the line that date stamped boxes of chocolate. He got the company to obtain copies of papers on solvent substitution that Danish trade unions had presented at the 1990 European Work Health Hazards Conference together with details of alternative materials from trade unions in Hamburg. The TGWU then obtained samples of a grape seed oil substitute as paid compensation in its case. "I think this is the way forward", its organ- ised as it is being investigated. It was tested by company scientists, found to be satisfactory and introduced shortly afterwards.

In Bolton, union members at a firms making coast bumpers nego- tiated the replacement of trichloroethylene (clean off green) with soap and water.

Join the campaign

European Campaign for Substitu- tion of Organic Solvents - the Danish experience - all materials are available in English.

Solvents Campaign (UK group) Andy Mills c/o SCONPUS, Meldon's Building 37 Exchange St, Sheffield S2 5EF

Main types of solvent

Organic solvents is a term covering a number of different families of chemicals:

- Benzene, toluene, xylenes and styrene:
- Ketones and aldehydes:
- Ethyl acetate, aceton, amyl and butyl alcohol, formaldehyde.
- Chlorinated hydrocarbons:
- Chlorinated hydrocarbons: eg dichloromethane, carbon tetrachloride, trichloroethylene, tetrachloroethylene, perchloroethylene, chlorofluorocarbons (CFC's).

Useful information


Solvents on the attack (HB 22.2) Worle Park, Bristol: SCONPUS, IDC Health and Safety Guide 109, avenue du Creusot de B, 92-1505 Brussels, Belgium

Safe Alternatives Hazards 31.

References:


 workplace symptoms questionnaire

1. Do you feel that your memory has become poorer than it used to be?
2. Do you use more notes than you used to, in order not to forget appointments, when shopping etc?
3. Do you feel it has become more difficult for you to remember what you have seen on TV or read in the newspaper?
4. Do you feel that your ability to concentrate is poorer than it used to be?
5. Do you get emotional more easily than you used to (e.g when watching something sad on TV)?
6. Do you have your workmates or relatives complained that you are more talkative or irritable than you used to be?
7. Do you feel that your way of thinking has become slower or less clear than it used to be?
8. Do you feel that your ability to adapt to new conditions has become poorer (as new work, people) ?
9. Do you engage in leisure-time activities and hobbies as you used to do?
10. If you start doing something - do you then get tired and lose your concentration more quickly than you used to?
11. Are you less tolerant of alcohol than you used to be?
12. Do you tolerate the smell or solvents or other air pollution less well than you used to?