ENVIRONMENTAL & OCCUPATIONAL HEALTH & SAFETY UNIT Victoria

CFMEU

Hazard Alert

PCBs IN CONCRETE STRUCTURES

WHAT ARE PCBs?

PCBs is an abbreviation for polychlorinated Biphenyls, a group of synthetic chlorinated organic compounds which have been an important ingredient in many industrial products.

PCBs are very stable chemicals that resist change from the passage of time, from wide temperature variance and from the influence of acids and alkalis.

What effects can PCBs have on humans?

PCBs can enter the body in three ways:

1. Swallowed in contaminated food and drink.
2. Inhaled as vapour (though the quantity given off at room temperature is not significant).
3. Absorbed through the skin (this is the most likely entry by PCBs from caulking compounds).

Once in the body, PCBs tend to lodge in the fat and stay there for a long time. The stability that made PCBs so useful also prevents the body from eliminating them.

Excessive amounts of PCBs in the body can cause irritation to the eyes and long term health problems to the skin, hair and liver. A persistent pungent body odour may be experienced. Other health problems have been reported as a result of accidental occupational and public exposure.

The International Agency for Research on Cancer classifies PCBs in Group 2A; that is, probably causing cancer in humans. The available studies on accidental ingestion of large doses suggest an association between cancer and exposure to PCBs. The increased risk from hepatobiliary (liver) cancer emerged consistently in different studies. However, the number of studies is small, so dose-response relationships could not be evaluated and the role of compounds other than PCBs could not be excluded. Hence, the evidence was considered to be limited.

Biological monitoring or medical examination is of limited assistance in determining effects unless high exposures have occurred and assessment is performed soon after that exposure.

Caulking compound in an expansion joint of a concrete structure.

Concrete caulking containing PCBs

Concrete caulking compounds containing PCBs were used in expansion joints in nearly all concrete structures erected prior to 1980. Examples of these expansion joints can be found in office buildings, bridges, car parks, entertainment facilities, water storage tanks and many other concrete structures. Their prime purpose was to seal the joint and keep out sand and water.Due to their compatibility with synthetic rubber e.g. polysulphide caulking compounds, PCBs

were used as a plasticiser. These caulking compounds may contain up to 30% PCBs continued on construction until about 1980. the caulking compounds containing PCBs varied in colour from grey through to black.

The normal life of a caulking compound is 15-20 years when replacement may be required. This can depend upon the environmental conditions and where they are used.

All buildings having expansion joints and built between the 1940s and the late 1970s are likely to contain PCBs in the caulking compound. Analytical laboratories can determine whether the caulking compounds contain PCBs.

PCBs contamination level

The WorkSafe Western Australia Commission has stated that if the concentration of PCBs is greater than 50 parts per million in solids or liquids, they should be considered contaminated and may require special procedures for handling and disposal. PCBs are in the National Occupational Safety and Health Commission 'List of Designated Hazardous Substances' (NOHSC; 10005 (1999)) as hazardous at levels above 50 parts per million (0.005%).

Bitumen caulking compound

Bitumens have also been used as caulking compounds, mainly on roads, footpaths or other horizontal expansion joints. Bitumens are always black in colour and in general do not contain PCBs. The bitumens are identified by their high flexibility and that they can be stretched. Bitumen caulking compounds can normally be seen spread out past the expansion joint since thy do not return to their original shape after compression or stretching.

Polysulphide caulking compounds containing PCBs are far more rigid and keep their shape.

Consultation in assessing the hazard

Application of the *Occupational Safety and Health Act 1985* in workplaces requires employers to consult with and provide specific information to employees and safety and health representatives. Employers should follow a procedure that has been agreed upon by all parties in the workplace which will cover consultation and co-operation in the management and reduction of risk arising from hazards such as PCBs in concrete caulking compounds. The provisions of Section 21 of the *Occupational Safety and Health Act 1985* should apply.

Removal or sealing of PCBs caulking compounds

Removal or sealing should be considered when the caulking compound is:

- Leaching PCBs to the surface and skin contact occurs
- Causing PCBs contamination of the air, including dust, above the exposure standard or 0.5mg/m3; or
- Penetrated by water

Material contaminated with released PCBs must be disposed of or decontaminated (see Safe Disposal)

Where removal of PCBs caulking compound is necessary, skin contact should be avoided.

The PCBs caulking compound being removed should not be heated or burnt, and measures should be taken to minimise dust generated in the process. The process of removal should include engineering controls based on good occupational hygiene practices.

As with other hazardous substances, a hierarchy of control measures should be considered for the handling of PCBs caulking compounds. The following order is recommended:

- Isolation to control the emission of PCBs or PCBs dusts;
- Engineering controls to minimise the direct handling of caulking compounds and to minimise generating any airborne dust;
- Adoption of safe work practices;
- Where other effective means for control listed above are not practicable, suitable personal protective equipment is to be used.

The removed PCBs caulking compound must be treated as PCBs waste and placed in plastic bags, stored in an adequately labelled steel drum and disposed of as recommended in the Safe Disposal of PCBs waste section of this Alert.

Demolition of structures containing PCBs caulking compounds

The demolition process may give rise to two types of exposure – that from the PCBs caulking compound itself and that from the dust.

Prior to demolition, any caulking compounds in the structure should be tested and those containing PCBs removed.

Bulk removal only is required. Residue compound in the joint will only make up a small component in the rubble. The handling of this rubble with mechanical equipment is not considered a health risk.

As with any demolition process, dust will be generated and will constitute a hazard if it exceeds the exposure standard (0.1 milligrams per cubic metre of air for quartz). Appropriate dust control methods must be used.

Personal protective equipment

Personal protective equipment and clothing required for handling PCBs caulking compounds include:

- Chemically impervious disposable overalls (e.g. Tyvek);
- Mid-arm nitrile rubber gloves;
- Safety glasses;
- Rubber boots, if in contact with water;
- P2 filter respirators if dust is being generated.

If skin contamination occurs, this area of skin should be washed immediately with soap and water. Water alone is not sufficient. If clothing is contaminated it should be removed and disposed with as recommended below. Organic solvents like kerosene or petrol should not be used to wash the skin.

Safe disposal of PCBs waste

The correct disposal of waste PCBs caulking compounds and contaminated material will prevent the entry of PCBs into the food chain and the general environment. PCBs must not be dumped or hosed away because of their potential to enter the food chain.

Solid and liquid contaminated waste

Caulking compounds containing PCBs should be placed in plastic bags and stored in a sound steel drum.

Soak up water contaminated with PCBs from caulking compounds with an absorbent material, such as sawdust, vermiculite, clay, rags, etc. as would be used for oil. Place the material in plastic bags and store in a sound steel drum. Any protective clothing should be treated the same way.

The drum should be clearly labelled for easy identification, and stored in a separate, secure place. Labels and advice on storage are detailed below.

PCBs contaminated equipment and tools

When cleaning up PCBs contaminated tools, chemically impervious disposable overalls, appropriate mid-arm length gloves and safety glasses must be worn.

Labels and advice on disposal

Prior to disposing of any PCBs waste (and for yellow labels that should be attached to containers carrying PCBs waste), contact the local EPA for disposal advice.

Ordinary incinerators are not effective and must not be used because they produce even more hazardous dioxins from the incomplete combustion of PCBs.

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