

Acrylamide

L Hagmar et al. Scandinavian Journal of Work, Environment and Health. August (2001) Vol.27 #4 p 219.

Acrylamide poisoning has been known in man since 1953.

Apart from manufacture, exposure is usually related to contact with Polyacrylamide (which has not been found toxic) which will contain un-reacted monomer (i.e. acrylamide).

Polyacrylamide is used in the construction of tunnels, where it acts as a waterproof grouting agent. Alternatives to polyacrylamide are available – but not as well tested.

Acrylamide is slowly metabolised after exposure, half-life of the order of months. Long term consequences of exposure are not well known.

In this study cumulative dose was measured using blood levels as a proxy variable.

The study focussed on 210 tunnel workers, exposed during a 2 month period of grouting activity. The workers were contacted a week after grouting work ceased. 13 had refused to provide blood, 19 had moved on and could not be included in the study.

Initial exam asked about medical history, smoking, vibrating tools, work tasks, symptom history. Workers were assessed by an occupational physician. Closer examination was ordered for those reporting changes to peripheral nerve symptoms (PNS) and those with more than 0.3 nmol/g (globin).

All examinees were followed-up and reexamined at 6,12 and 18 months.

At initial examination, 47 had levels within the normal background range 0.02 to 0.07 nmol/g (globin). 163 were found to have raised levels, max = 17.7 nmol/g (globin).

A dose response relationship between dose (blood level) and disturbance to the peripheral nervous system (PNS) was found. 39% of those with >1.0 nmol/g (globin) had numbness and or tingling.

This relationship allowed the identification of a “no observable adverse effect level” (NOAEL) = 0.51 nmol/g (for numbness and tingling)

23 had a strong PNS impairment. All but two had completely recovered at 18 months.

The half-life for PNS symptoms was 6 months even though the concentration half-life was 40 to 80 days.

Association with allergic reactions in the skin were not significant.

Job analysis showed that the most significant source of exposure was through the skin and not via inhalation.

Comment

Short-term effects seem to be largely reversible and not severe, following this type of exposure. Workers should wear protective gloves.

This study group would form a well-characterised population for studies of long term effects, as yet unknown.

