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LETTER TO THE EDITOR

Asbestos dust levels during work with cloths made from liquid dispersed chrysotile

Sir,

The protective measures necessary for maintaining asbestos dust concentrations in the workshop below an acceptable level will depend not only on the working procedure but also on the dustiness of the material used. Thus, it is highly desirable to find asbestos products that generate dust in such low concentrations that ventilation can be kept at a manageable level, or personal protective equipment can be avoided.

Chrysotile asbestos fabrics have for some time been produced using a liquid dispersion method, and cloths can be manufactured ("Fortex" from Turner Brothers Asbestos Co. Ltd., England and "Tilon" from Rex Asbestwerke, Western Germany) which appear to produce much less dust during handling than conventional cloths.

This has been investigated in Gothenburg, Sweden in 1970. Measurements were carried out during manufacturing and handling of mattresses and covering of primary pipe insulation using "Tilon" cloth. Low concentrations were found (0·4–1·9 fibres/cm^3). Prior to handling, the asbestos was wetted, which seems to be common practice in Sweden. However, it can not be considered to be common practice in all countries. The investigation was therefore repeated in Copenhagen in 1971 by the Danish State Institute of Occupational Hygiene at the premises of a Danish insulation firm in a workshop, 3·80 × 7·50 m, height 2·50 m (71 m^3), commonly used for manufacture of insulation mattresses. Every care was taken to minimize the background dust level (all surfaces freshly painted, clean overalls, etc.); see also below.

The working procedure investigated was the manufacture of insulation mattresses by two workers. There was no ventilation at all during the work. The materials used were "Fortex" type FC 860 cloth, Turners YPM 463/3 yarn and mineral wool. All the materials were dry.

Dust samples were collected using 2 stationary samplers (flow rate 10 l/min) and 2 personal samplers (flow rate 1·3 l/min), sampling period 30 min. Millipore® membrane filters dia 37 mm, pore size 0·8 μm were used. A segment from each filter was cleared using acetone vapour* and all the fibres (length:width min 3:1) between 5 and 100 μm long seen under positive phase contrast (45 × objective, 75 per cent absorption in phase ring) were counted ($= x$). From 10 selected filters another segment was cleared using Glycerol Triacetate (The Asbestosis Research Council, 1971), and the total fibres were again counted ($= y$). y and x refer to fibres/40 fields. The orthogonal regression line was $y = 1{\cdot}1 + 1{\cdot}0x$, $y_{min} = 28$, $y_{max} = 175$.

* Acetone vapour is condensed on a filter segment placed dustside downward on a glass slide. This results in slides that are durable and in which the dust particles within the field of view of the microscope have extremely narrow depth distribution.

Number of samples averaged	Process	Stationary		Personal	
		Total	Non-chrysotile	Total	Non-chrysotile
2	Background			0·01	
4	Unrolling cloth, measuring, cutting with scissors, folding of cloth	0·33	0·05	0·68	0·1
6	Making mattresses by hand (includes filling with mineral wool)	0·46	0·17	0·90	0·3

The mineral wool fibres having a refractive index $n_D = 1{\cdot}60$ and some other non-chrysotile fibres could be determined using the method of dispersion staining (BEYER, 1965). The difference between the total and the non-chrysotile fibres gives the chrysotile fibres, including a few others.

The average concentration of the total and non-chrysotile fibres expressed in fibres/cm^3 for the stationary and the personal samples are shown in the Table. The background was measured with personal samplers placed 25 cm above the table in the completely empty room.

It is apparent from the Table that the processing of dry asbestos cloth in mattress making using "Fortex" cloth generates fibre concentrations well below the acceptable limit.

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