

into the text, sometimes due to oversimplification. These are related to the description of various points including ozone toxicity (is it "highly toxic"?) and its relevance, effects of polychlorinated biphenyls, definition of toxicological risk (is it really "often defined as LD₅₀"?), and some of the information provided is outdated.

In conclusion, the book provides some interesting information on chemicals in the environment, but it does not really cover all relevant aspects of the subject. Despite the imbalance between the description of effects on ecosystems and on human health, and despite some inaccuracies, it is useful as an introductory text to ecotoxicology.

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International Programme on Chemical Safety (IPCS) Environmental Health Criteria 151 "Selected Synthetic Organic Fibres". (Pp 100: price Swiss Francs 20 or 14 in developing countries). 1993. World Health Organisation, Geneva, Switzerland: World Health Organisation. ISBN 92 4 157151 9.

Over the past few decades we have all become painfully aware of the health effects of asbestos and therefore more worried about other mineral fibres, both natural and synthetic. The consensus from experimental work is that the activity of fibres has little to do with their chemical composition and any mineral fibre of the right size and which persists in the lungs, or associated tissue, must be treated with suspicion.

Natural organic fibres are also not without their own risks but the possibility that synthetic organic fibres could have properties similar to asbestos only became apparent when aramid and carbon fibres were used as asbestos substitutes. There are only data on the biological effects of a few synthetic organic fibres and therefore it is these few "selected" fibres, carbon, aramid, and polyolefin that are the subject of one of the Environmental Health Criteria documents of the International Programme on Chemical Safety of the World Health Organisation.

These reports comprise a thorough review of the literature and an evaluation of any human health risks from the materials under consideration; they conclude with sections on protecting human health and on further research. The review in this case is a little too thorough including at least one study that is not on fibres at all and therefore not relevant to the subject. Although based on a very limited range of materials the report draws conclusions that may apply to organic fibres in general. The most significant conclusion, and one with which I wholeheartedly concur, is that "exposure to respirable, durable organic fibres is of potential health concern". Unfortunately, however, the report is marred by one major error that could lead to an erroneous assessment of any hazard from organic fibres. This mistake is a confusion about how such fibres differ from, or are similar to, the more extensively studied mineral fibres.

Mineral fibres have specific densities of about 3 although the bulk of organic fibres are closer to unit density (that is with a

specific gravity of one), carbon fibres can have specific densities of up to perhaps 2.2. These differences in density affect the falling speed of fibres in air and it is this that largely determines whether a particle is respirable or not. For an ideal cylindrical fibre falling speed is proportional to cross sectional area and the falling speed of any small particle is directly proportional to the difference in the density of the particle and that of air (a buoyancy factor). For materials as dense as these respirability can be regarded as being directly proportional to density. Most texts dealing with respirability describe the behaviour of spheres of unit density and the role of any differences in density gets forgotten. In this document this has led to some of the considerations affecting the deposition of mineral fibres being directly applied to organic fibres. Thus the 1:3 ratio between physical fibre diameter and aerodynamic diameter, which is frequently used as a crude conversion factor for mineral fibres, is given as if true for all fibres. For a fibre with a specific density of about 3, respirability will reduce as diameter increases until at about 3 μm the fibres can be regarded as not respirable. With a specific density of 1 the same would only be true at diameters well over 5 μm . The actual determinants of respirability for organic fibres are much more complex than for the ideal cylinder model. Figure 1 in this report shows a scanning electron micrograph of Kevlar (p-aramid) and this seems to be branched with fibrils breaking away from the surface; this type of fibre will behave as if its density were well below one. As many organic fibres have similar complex shapes the only way to determine respirability is by direct measurement of falling speed or sampling with an appropriate size selective sampler. Many fine fibres are now reaching the market place and many of them will contain respirable fibres that would be ignored if the approach used in this document were true. Assessing the potential of these fibres to cause significant exposure requires great care.

This confusion between mineral and organic fibres is implicit in many parts of the report and reference is made to the counting of the so called "WHO fibres". These are of a size and shape devised for counting mineral fibres on filters from occupational hygiene samples. It is assumed that this size has been determined by the WHO to be those with the biological activity responsible for pathogenicity. This is not true and the use of this definition for inappropriate purposes causes considerable problems. The application of size rules devised for mineral fibres will almost always underestimate the hazardous properties of organic fibres.

In the other direction, that of increasing vigilance, one of the conclusions of the report (number 3) seems unusually extreme. Although it is very difficult to understand, probably through having been garbled in the word processor, it seems to suggest that all respirable and biopersistent fibres should be treated as asbestos unless evidence to the contrary is obtained. Given that many polymeric fibres must be persistent, as is witnessed by the long life of sutures and implants, this would suggest that many products made of fine fibres of these polymers should carry warning labels and that the fibres should face asbestos-like bans. I cannot imagine what the appropriate

wording would be for such labels but in practice polymeric fibres will always be less dusty than asbestos and could not cause similar exposures. Many people, and I am one, believe that dustiness is an inherent property of this type of material and this should be part of hazard identification; this is an example where the concepts of hazard and risk are difficult to apply to materials whose effect is determined by their physical form rather than chemical reactivity.

In general, then, this is an interesting review but with distinct dangers to both health protection and commerce. This is not typical of the IPCS documents and we must hope that further reports considering any risk from organic fibres become rapidly available and that they do not perpetuate the errors in this document.

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Guidelines on Testing for Drugs of Abuse in the Workplace. By Faculty of Occupational Medicine (Pp 28, £10). 1994. London: Faculty of Occupational Medicine of the Royal College of Physicians. ISBN 1-873240-86-X.

Drugs of abuse seem now to be so widely available that we must all be anxious about the social and medical consequences of their so called recreational use and wider consumption. To test employees routinely for the consumption of such drugs is not yet policy in many countries, but it may become so in certain jobs, possibly after a suspicious incident, or as a precautionary measure.

The institution of a programme of unannounced or predetermined testing of employees raises major legal and ethical issues for the occupational physician and other professionals concerned with obtaining samples and the analysis and interpretations of the results, and for them and others responsible for subsequent actions, ranging from help to punishment.

A Working Party of the Faculty of Occupational Medicine has attempted to tackle these issues while they are still nascent in Britain. This pamphlet provides guidance about why testing programmes may be done (excluding smoking and alcohol), the ethical, legal, and forensic precautions required in collecting and handling samples, and the role of the Occupational Physician both in devising management policy and in helping people with a positive test. The document is too cautiously written to become self fulfilling by precipitating inadequately considered campaigns of testing. There seems little space between libertarians, reactionaries, and postmodern populists.

Like all general guidelines it tends to a breadth that sometimes risks loss of definition, but it does contain sage practical and professional advice. There might usefully have been a stronger section on the responsibilities of the physician to the individual, and the dilemma of confidentiality, but the cautious user of the guidelines will find much guidance about what to do and when, and help with this issue at work.

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