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In late May, delegates from 60 countries met in Canada for the World Symposium on Asbestos to debate the scientific, economic, political, social, administrative and ethical aspects of asbestos use. Terry Nash, formerly with Cape Industries and now a health and safety consultant, gives his view of the issues raised.

ASBESTOS

its use
must be
controlled

The World Symposium on Asbestos was originally planned as a bold attempt to involve scientists, management and labour in one major meeting to discuss the commercial future of asbestos. "To ban or not to ban?" That was the question.

In the event, it was a curious mixture of science and politics, which blended exactly as the proverbial oil and water. It produced an emulsion which temporarily rendered the whole situation opaque, to settle out again almost as soon as the conference was over without either component appreciably affecting the other.

Politics entered at the earliest planning stages. The symposium was organised and financed by the Canadian government, the provincial government of Quebec and the EEC, so that the potential taint of money from private industry was avoided. But, the province of Quebec mines almost as much asbestos as the rest of the world outside the USSR, so that its government, which has a controlling share in some of the mines, has a major interest in its promotion.

Attempts to get the European trades unions to participate had been greeted with the cry of "Whitewash!". In the end, few attended. This was a great pity and, coupled to the polarisation of certain members of the scientific fraternity around one eminent speaker, it resulted in a less balanced approach than one would have expected from such an important conference.

The scientific part of the proceedings provided little new material in research results and no new answers, but it did perhaps help to clarify the four main points:

- What is the nature of the dose response at low levels? Is there

any evidence for a threshold dose below which asbestos has no adverse effects?

- Are all three types of commercially used asbestos equally bad, or should chrysotile be treated differently from the amphiboles (crocidolite and amosite)?

- Are there any environmental effects of asbestos usage? What evidence is there that people other than those occupationally exposed are adversely affected?

- Are all respirable fibres equally suspect? What is known about other natural or man-made fibres? Is the shape or the chemistry to blame for the asbestos tragedy?

Dose response

An almost audible sigh of relief came from the industry side when one of the first speakers at the opening session, Irving Selikoff of the United States, made it clear that he was not advocating a total ban on asbestos. He merely wanted adequate control.

Corbett McDonald of Canada showed that the higher the fibre count multiplied by the years of work, the more deaths there were from lung cancer among asbestos workers. This straight-line relationship between cumulative dose and response was based on reasonable data on exposure levels available in the studies.

Professor McDonald emphasised that risks differed between different industrial situations and also between different fibres. Chrysotile was in his opinion much safer than crocidolite or amosite. He felt that chrysotile should be permitted to be used for friction materials, asbestos-cement products and perhaps textiles, but not in insulation. He concluded by saying that

the question of banning asbestos must not be considered in isolation, since there was some evidence already that man-made mineral fibre was not without risk. As regards the proposed European standard of one fibre/cc he said that workers exposed to this level of chrysotile were unlikely to show any detectable increase in lung cancer. For practical purposes, it was a "no-effect" level.

Hans Weill also thought that there was evidence for differences between chrysotile and the amphiboles (amosite and crocidolite) in the incidence of asbestosis and mesothelioma, as well as lung cancer. He discussed the difficulties in diagnosing early asbestosis, where minimal changes on chest x-ray caused the highest disagreement between readers, and where smoking and age could on their own be responsible for the changes.

In discussing pleural plaques, he pointed out that there was no evidence that they increased the mortality risk. He repeated the recommendation of the American College of Pathologists that the term pleural asbestosis should be dropped. Finally, he quoted evidence from McDonald's figures to suggest that there will be no excess of lung cancer in those occupationally exposed to asbestos at levels low enough to eliminate the risk of asbestosis.

The session ended with papers by two cancer experts, John Higginson and Dietrich Schmael, discussing the possibility of a threshold for asbestos-induced cancer. That is a level of fibre exposure which the body could tolerate without any cell damage of the type believed to be conducive to malignant change. Both believed that there was

evidence in favour of the threshold concept. All of this was very encouraging for persons exposed to the low levels demanded by current and proposed legislation.

Chrysotile or amphibole?

If the first session set a high scientific note, the second session was almost pure politics. The time set aside for panel discussion and questions was almost entirely filled with prepared speeches by interested parties - unions, management, politicians and concerned organisations. This was the pattern for all subsequent discussions.

Political considerations were very evident in the disagreement between the producer unions (representing miners and millers) and the consumer unions (representing mainly construction workers) about whether or not asbestos should be banned. They were equally evident between Canadian and South African interests, when differences between fibre types were discussed, since Canada produces only chrysotile while the world's supply of both crocidolite and amosite now comes from South Africa.

Little new evidence emerged on different risks and modes of action between chrysotile and crocidolite, and the puzzles remain. Both McDonald and Weill had stated their belief that the epidemiological evidence demonstrated lower risks for chrysotile.

Frederick Pooley of the UK and Alison McDonald of Canada discussed electron microscope findings which indicated in both humans and animals that chrysotile tended to break up and disappear after deposition in the lungs, while amphibole remained. This was consistent with a case control

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study of mesotheliomas which showed a positive association only with amphibole, and the known rarity of mesothelioma attributable to chrysotile exposure, in contrast - to crocidolite. The contrast between human epidemiology and animal experiments, in which chrysotile is more carcinogenic both when administered by inhalation or by implantation, was repeatedly emphasised but not explained.

Both Bill Simpson for the UK and William Hunter for the EEC stood by the more stringent controls imposed on crocidolite, which is to be prohibited in Europe except for the manufacture of pipes and special seals; this met with general approval from all except the South Africans. Nevertheless, certain questions remain. Arthur Langer, of the United States, in an interesting paper on physiochemical aspects, pointed out the difference in surface potential, that of amphibole being negative and chrysotile being positive. At the same time, he emphasised both the physical changes produced in the fibre by processing which may alter its toxic effects, and the factors such as surface area and falling velocity which influence the received dose. It remains a fact that there are no published series of membrane filter counts on manufacturing processes involving only crocidolite by which to judge true exposure levels in earlier years. The possibility that part of crocidolite's higher carcinogenicity is due to a higher count of very fine fibres for a given level of dustiness cannot be discounted.

Environmental risks

Discussion on asbestos in the environment produced an interesting contrast between theory and practice. Scientists tended to stress how very small a risk, if any, would result from fibre liberated into the environment in contemporary situations, while representatives of the various governmental agencies tended to play safe and err on the side of caution in exercising their regulatory function.

The conclusion was that, outside specific settings, for example, rooms with crumbling sprayed crocidolite, no valid assumptions about risk



The hazards of inhaling asbestos dust are said to be virtually eliminated by the use of Martindale positive pressure respirators, as seen at the Goodyear Tyre and Rubber Company factory, Drumchapel, Glasgow, where old asbestos insulation is being removed in the boiler house by Asbestos Protection Services (Photo: Martindale Protection Limited)

could be made on the basis of industrial experience. Confirmation was also available in an important paper by Jack Siemiaticky of Canada who had carried out a mortality study of the Thetford and Asbestos areas, where the Canadian mines are situated. Despite environmental asbestos levels more than 100 times greater than normal urban areas, there was no increase in the mortality rate for females either from all causes, from cancer in general, or lung cancer specifically. Males showed a significant increase in lung cancer, but 70 per cent had worked at least some time in the mines and the excess was attributable to their asbestos exposure at work.

Hazards of other fibres

Andrew Pye of the UK gave a detailed survey of the range of substitutes available. He stressed that there was no single universal substitute for asbestos, and for this and other reasons most substitutes were more expensive and involved compromises between performance and cost. Speakers from India and Zimbabwe, who followed, stressed the importance of asbestos, and particularly asbestos cement, for the developing countries and their great advantages over substitutes on a cost-benefit analysis.

Chris Wagner of the UK then gave a valuable survey of the possible health hazards of mineral substitutes. He divided them into four classes: man-made (vitreous) mineral

fibre; other forms of asbestos (mainly tremolite); fibrous zeolites (erionites); and fibrous clays such as palygorskite, sepiolite and attapulgite which are now finding increasing use. Fine tremolite has probably been responsible for mesotheliomas in the inhabitants of certain areas of Cyprus and Turkey, and erionite in Turkey, so that these materials should be viewed with suspicion. No such hazards have yet been demonstrated with either man-made mineral fibres or the fibrous clays, although certain notes of caution have been sounded over man-made mineral fibres, particularly over glass microfibrils and ceramic fibres.

Wagner did not discuss organic fibres, and questions were asked about the promising new aromatic polyamide (aramid) fibres manufactured by Du Pont under the trade names of Nomex and Kevlar. These are already finding many industrial uses as asbestos substitutes, particularly in textiles and friction materials. A high proportion of these fibres are in the respirable range. While a Du Pont representative claimed that their investigations had shown them to be harmless, there is so far no published evidence of their effect in the lungs.

What of the future?

Gloomy predictions had been made within the asbestos industry that the symposium would sound its death knell. In the event, however, it was

clear that neither scientists nor the regulatory agencies were in favour of a complete ban. While the unions were divided according to whether they represented producer or user industries, even the most vociferous of the latter, once their prepared speeches had been delivered, appeared to accept the possibility that asbestos might continue to be used under control limits for the foreseeable future.

Nevertheless, the momentum of substitution in Europe at least is now so great that it is unlikely to stop before asbestos is phased out in all but a few specialised areas. A majority of the Canadian mines and mills, hit by both recession and substitution, have already ceased production for three months this year.

Proposals for legislation

As far as the UK is concerned, there have been new legislative proposals in the wings for some considerable time. The main report of the Advisory Committee on Asbestos (ACA) made over 40 recommendations in 1978 backed up by two subsidiary reports - one on "Monitoring", the other on "Thermal Insulation Work". Progress on both of these latter items appears to have gone on quite well. A Central Reference Scheme for Asbestos Sampling is well established and it is understood from an HSE spokesman that the final thermal insulation proposals are soon to be placed before the HSC.

On the broader front of new control limits and prohibitions, the UK government has patiently been awaiting action in the European Community. Current progress on the asbestos directives has taken a decided turn for the better, helped apparently by decisions relating to the earlier lead directive which had been clogging the pipeline. Should European Community action fail to materialise, there is little doubt that the UK will now "go it alone" down the established route. It is becoming an acute embarrassment to have had such a long delay with so little action since the evidence of the ACA was published, even though subsequent consultation clarified many of the sticking points between the social partners.