

Shipyard workers and asbestos: a persistent and international problem

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Recycling ships for scrap also recycles the asbestos hazard

The fact that workers from a US shipyard are experiencing an excess of diffuse malignant mesothelioma of the pleura and peritoneum from their exposure to asbestos in the years 1950–64, as reported by Krstev and colleagues in this issue (*see page 651*),¹ is at first glance not surprising. In their cause-of-death follow-up study of 4700 men and women who built and maintained sea-going vessels, they observed excess deaths from diffuse malignant mesothelioma and respiratory cancer, which they attribute to asbestos fibres at the shipyard.

Asbestos originates underground as a fibrous crystalline mineral, is mined and then crushed in mills into a powder of very thin and durable fibres. During the 20th century it was transported worldwide to industrial shipyards and factories for use as a heat insulator, fireproof material, and in a multitude of other economically useful applications. It is ironic, given its adverse health effects, that asbestos was often used to protect lives. For example, many theatres in the US prominently labelled their asbestos fabric stage curtains “ASBESTOS” to reassure patrons of safety in case of a fire.

The addition of vast tonnes of this material to insulate the hulls, boilers and pipes of military vessels during and after the Second World War was accompanied by formal inquiries into the health of those exposed. Occupational health experts recognised some of the dangers and warned about the hazard in the 1940s, but both government and society failed to appreciate the persistence and durability of asbestos fibres, and the magnitude and range of their hazards.²

One result of this failure is the excess mortality now seen in the employees of the shipyard described, who were exposed in the decades after the warning was made. It was not until Harries,³ Stumphius,⁴ and Selikoff⁵ reported high rates of asbestos disease in shipyard workers in the UK, the Netherlands, and

the US in the 1960s and 1970s that society and shipyards began to take the threat of asbestos more seriously. In those years, it came as a surprise to see asbestos disease in the chest radiographs not only of the asbestos insulation workers, but also of office workers and guards who had no direct asbestos contact. The massive task of removing asbestos insulation from ships, and replacing it with non-asbestos insulation, was begun in those years, but has not yet been completed. Now 30 years later, we should be able to look back at the asbestos epidemic in shipyards as a past failure of preventive action. Yet the epidemic is not over, and the protection of all shipyard workers has still not been achieved.

Shipyard workers in Japan continue to be diagnosed with asbestos-related diseases, though use of asbestos in Japan peaked in the 1970s and has since been banned.⁶ Investigators from India's National Institute for Occupational Health recently confirmed the presence of early asbestos-induced changes in the radiographs of current workers in the Gujarati ship-breaking industry, where vessels containing asbestos, most often from Western countries, are dismantled by inadequately protected labourers. Public outcry in India in 2006 sent the aged French aircraft carrier *Clemenceau*, en route to be dismantled in India, back to France to have the asbestos abated by properly protected workers.

Asbestos continues its legacy wherever it has been found or used—in mining towns of Canada, South Africa, Zimbabwe, Australia, Russia, India and Brazil; in the shipyards, factories, and office buildings of England, Belgium, the US, Italy, and Japan among others; and now most recently in the ship-breaking graveyards of India, Pakistan, and Bangladesh.

As is often the case with industrial toxins, some of the very qualities which made asbestos so highly useful in industry—its tremendous resilience against

physical and chemical degradation—contribute to its persistence in the environment as well as in the lungs, and hence to the seriousness of its health effects. Asbestos is so tough that it usually outlives the products in which it is used. When the product—such as asbestos-cement roof tiles now widely used in India—finally deteriorates, the asbestos fibres can again be released into the environment. One can speculate that a single batch of asbestos mined in the 1930s could have resulted in plaques and asbestosis in Canadian miners in the 1960s, lung cancer and mesothelioma in US shipyard workers in the 1970s, and in the future, result in lung disease in Indian and Pakistani ship-breakers in the 2010s, and mesothelioma in the 2030s in Indians and Pakistanis exposed currently as children to improperly discarded asbestos waste.

The authors of the present study share in the widely-held misconception that asbestos was completely banned in the US in the 1970s. In fact, a government attempt to ban asbestos was blocked at the 11th hour, and although tightly regulated, imported asbestos is still used in a few commercial products in the US as well as in many other countries. The long environmental persistence of asbestos, and its equally persistent health effects, argue for an end to removing it from the earth, so that we may finally prevent illness in future generations.

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