

Fate of The Miraculous Mineral – Ban Asbestos Worldwide Campaign

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ABSTRACT

Asbestos is a generic term used to describe natural mineral fibers found in the ground in many regions of the world. This cheap material with special chemical and physical properties that make it virtually indestructible was widely used in the 20th century. Within twenty years of the first industrial production, the public health hazards associated with asbestos started to come to light. Asbestos has become one of the most worrying industrial pollutants, since it poses a health hazard of asbestosis, lung cancer, mesotheliomas, and benign changes in the pleura. In spite of the WHO recommendations, environmental health criteria and their revision, asbestos is still around.

What is Asbestos?

Those who do not know the asbestos story should be primed with a few facts. Asbestos is not one material. It is a generic term used to describe natural mineral fibers found in many regions of the world, especially in Quebec, the former USSR, South Africa, Brazil, France, and Italy. Of six commercial minerals with that name at least three are still in use. The best known and the most exploited is a serpentine chrysotile or white asbestos. Others are amphiboles distinguished by their stoichiometry. The best known of these is crocidolite or blue asbestos. For many years amphiboles, particularly blue asbestos, were considered more toxic than the white asbestos¹. Asbestos has

been declared a proven human carcinogen by the US Environmental Protection Agency (EPA) in 1986, and by International Agency for Research on Cancer (IARC) of the World Health Organization in 1987^{2,3}. By 1999, the use of amphibole asbestos, crocidolite and amosite, has been banned in most European countries whereas chrysotile still makes part of a number of widely used products, notably asbestos cement and friction linings in vehicle brakes and clutches. A chrysotile ban for these remaining applications is currently under consideration throughout the European Union⁴. Science has positively shown that it causes cancer⁵, and that it is not less dangerous than amphiboles, as was believed earlier⁶.

History of Asbestos Usage

Limited use of asbestos in pottery dates back to 2500 BC⁷. It was not widely used prior to the latter 19th Century. Since that time, more than 3000 uses of asbestos have been recorded, mainly in the construction industry, in asbestos cement sheet and pipe, in flooring and roofing products, in electrical and thermal insulation materials, friction products, coatings, compounds and textiles, and also heat shields for spacecrafts. This material with special chemical and physical properties, which make it virtually indestructible, was widely used because of chemical and fire resistance, mechanical strength, ability to be spun and woven, flexibility, resistance to heat, cold, noise, and corrosion, great durability, and good friction and wear characteristics. Besides these industrially favorable perhaps the most important is that asbestos is cheap. One need not be surprised that asbestos was considered miraculous and magic material.

In January 1906, the *Saturday Evening Post* advertised the magic mineral saying: in these words...(asbestos)... »Serves more people in more ways than any institution of its kind in the world«. And it did. Unfortunately, dust of asbestos has been shown to be potentially harmful to human health, very soon. Demand for this mineral during the World War II caused a worldwide boom in asbestos consumption. Asbestos soon became the most exploited mineral of the 20th century. The result is the widespread dissemination of asbestos dust in the total environment, in the air we breathe, in the food and beverages we consume, and in the water we drink. Asbestos no longer represents only an occupational hazard, but a lasting and a growing problem of environmental pollution threatening everyone⁸.

Knowledge of the Health Effects of Exposure to Asbestos and Need for Regulations

Within twenty years from the first industrial production of asbestos, the public health hazards associated with asbestos started to come to light. The first recorded death resulting from inhalation of asbestos dust was reported, in London, in a 33 year old man who had worked in an asbestos textile plant for 14 years. The report was issued by a Charing Cross Hospital physician Dr. Montague Murray in 1900. Before 1930, asbestos had been used without much thought of possible harmful effects, although we now realize that there had been earlier indications of ill effects^{8,10}. The word *asbestosis* was introduced into medical literature by Cooke in 1927 to designate a type of pneumoconiosis induced by the inhalation of asbestos dust¹¹. It was already known that the disease was progressive, even after cessation of exposure, and that fibrosis could fully develop in seven to nine years, and that it could result in death in about thirteen years. Furthermore, Lanza wrote in 1927 that exposure to smaller concentrations could prolong the development of the fibrosis from fifteen to twenty-five years. Exposure to high concentrations shortens that period, that is, it takes less time for the fibrosis to fully develop¹².

Triggered by this appalling cognition, the interest in the health aspects of asbestos, gained scientific and social momentum. The first national meeting on the adverse health effects and ultimate consequences of exposure to asbestos, was convened at the New York Academy of Sciences in 1964. The conference reported the known health effects of exposure to asbestos, and emphasized the areas of prevention, including dust control, community and other indirect exposures, and the significance of air pollution control.

It has long been known that the suppression of dust was the best method to control diseases associated with exposu-

res to dusts. There are many methods to prevent exposure to hazardous dusts. Some early attempts to monitor the exposure of asbestos workers recorded all the particles thought to be respirable, after which newly developed methods involved counting only of fibers within the limits in size and shape. In 1968 the standards for chrysotile asbestos ranged from 1 fiber/cm³ in air in Sweden to 5 fibers/cm³ in air in the USA, and Finland. The prevailing standard was 2 fibers/cm³ of air (Belgium, Canada, Denmark, France, Germany, South Africa, UK, and USSR)⁸. Seven years later, the medical and scientific evidence concerning the increased health hazards associated with exposure to asbestos has become such that in the United States Occupational Safety and Health Administration (OSHA) designated asbestos as human carcinogen. In 1977 the International Agency for Research on Cancer stated...« it is not possible to assess whether there is a level of exposure to asbestos for humans below which an increased risk of cancer would not occur». The WHO Task Group on Environmental Health Criteria for Asbestos and Other Natural Mineral Fibers brought out the criteria document in 1986. which reported that the majority of the samples taken had fiber concentration <0.5 fiber/cm³ of air and <1.0 fiber/cm³ of air in textile or asbestos-cement industry in UK and France¹³. Further efforts were focused on possible reduction of environmental asbestos exposure, including the evaluation of a number of possible substitute fibers such as man-made mineral fibers, and selected organic synthetic fibers¹⁴.

Asbestos: One of the Major Public Health Problems of the Twentieth Century

Asbestos has been known to be one of the most worrying industrial pollutants, since it poses a health hazard that may result in asbestosis, lung cancer, mesotheliomas, and benign changes in the

pleura. Besides the occupational health risk, there appeared para-occupational risk in households neighboring, asbestos-processing industries, and in the general population. During the past three decades, ill health resulting from exposure to asbestos has been the subject of intensive observation and research – probably more intensive than research on any other environmental agent^{15–20}.

The diseases associated with asbestos inhalation are basically of two types – asbestosis and cancers. The pathophysiological mechanisms underlying the development of severe disabling asbestos-related respiratory diseases are still under intensive investigation, since several pathways occur simultaneously and interfere mutually^{21–25}. Asbestosis is a form of pneumoconiosis, i.e. a disease of the lungs associated with the accumulation of particles in the lungs and various tissue-related reactions to that accumulation. The accumulation leads to progressive fibrous thickening of the alveolar walls that causes poor oxygenation of the blood and places an additional strain on the heart. The symptoms are the same as for other progressive fibroses: short breath, dry cough, permanent feeling of lack of air, loss of weight, and dyspnoea following physical effort. Asbestosis has a long latent period of 15 to 20 years on average. Its development is slow and irreversible²⁶. Cessation of exposure to asbestos does not halt its development. There is no known treatment. Asbestosis is a progressive disease even in the absence of further exposure either of the amphibole or serpentine type of asbestos²⁷.

Asbestosis is not specific to humans and was found in non-experimental animals^{28,29}. Asbestos exposure seems to increase the risk of all histological types of lung cancer and cancers of other organs. Lung cancer seems to be a frequent complication of asbestosis. Unfortunately, there are no pathological features that distinguish the asbestos-related lung

cancer³⁰, but the tumor commonly develops from asbestosis in the lower lobes³¹. It has been shown that asbestos cause malignant mesothelioma, which became known only in the 1960s. At times mild, transient, and discoverable only by painstaking inquiry the mesothelioma is almost exclusively associated with asbestos exposure, and it too may have a long latent period³². This tumor commonly involves the pleura or peritoneum, and is characterized by pain and effusion. The disease may advance by infiltrating contiguous structures or may metastasize via the lymphatic or the bloodstream. The tumor is invasive and never reaches a stable size. Surgical exploration of patients with mesothelioma is generally discouraged. The treatment, when applied, involves pleurectomy, radiation, and chemotherapy. However, few patients survive beyond one year from the time of diagnosis³³. Asbestos can also cause pleural plaques. These are usually not associated with any ill effects but occasionally individuals may experience pain³⁴.

Ban Asbestos Network

A written procedure, which brings an end to the asbestos use, has been adopted throughout all Member States of the European Union (EU) on July 26, 1999. This document updated the Annex 1 of the Directive 76/769/EEC on dangerous substances and preparations. New applications of asbestos in cement materials, friction products, seals, and gaskets will be prohibited from January 1, 2005. The prohibition will apply to chrysotile, and the already banned amosite, and crocidolite. The directive stated: »no threshold level of exposure has yet been identified below which asbestos does not pose carcinogenic risks«. The grave hazards of exposure to asbestos and the availability of some safer substitute materials have led a growing number of countries to eliminate all import and usage of asbestos. The US saw, a drastic reduction of asbes-

tos usage from 719.000 tons in 1973 to 15.000 tons in 1999. Unilateral bans are already in place in Austria, Belgium, Denmark, Finland, Norway, France, FRG, Italy, Netherlands, Sweden, UK, Poland, Saudi Arabia, and Slovenia. The Republic of Chile joined those who have already banned asbestos on January 13, 2001. Although new legislation, in the above-mentioned countries, has curbed the growth of this »miracle product« in recent years, asbestos is still extensively used in many parts of the globe. Scientists, responsible authorities, and particularly asbestos industry people in countries still allowing the use of asbestos should have no illusions that the »controlled use« of asbestos is a real alternative to a ban. To allow its use in manufacture means to ignore the known reality that working conditions in China, India, Brazil, Korea, Russia and many other countries are far from »controlled«. Moreover, even the best workplace controls cannot prevent occupational and environmental exposure to products in use or to waste. The asbestos industry has powerful influence in many countries. Canada and Russia and other asbestos-exporting countries have developed major markets in the newly industrializing nations. Now asbestos poses a serious hazard in developing countries. The commercial tactics of the asbestos industry is such that the losses resulting from the reduction of asbestos use in the developed countries is compensated by increased sale to the Third World. The asbestos industry is progressively transferring its activities and the health hazards to Brazil, India, Thailand, Nigeria, Angola, Mexico, Uruguay, and Argentina. Russia is now the leading producer and consumer of asbestos in the world then follow Canada, Kazakhstan, China, and Brazil. The long delay between exposure and illness means that the epidemic and asbestos-related diseases will continue to be an issue in developing countries for many decades³⁵.

The effort for an international ban of asbestos bringing together people such as asbestos victims, politicians, social activist, trade unions, medical professionals, scientists, attorneys, engineers, hygienists, government officials and other interested groups as it has been seen during the Global Asbestos Congress held in Sao Paulo, Brazil in 2000. The Congress was organized by ABREA (Association of Brazilians Exposed to Asbestos), IBAS (the International Ban Asbestos Secretariat), and BAN (Ban Asbestos Network). Collegium Ramazzini from Italy is an international academic society that examines critical issues in occupational and environmental medicine. Collegium is dedicated to the prevention of occupational diseases and the promotion of health. Collegium Ramazzini appealed for an immediate international ban on asbestos³⁶. The IBAS is also working with this goal. IBAS, is a new organization set up in 1999. to work along side the BAN, a well-established body that has been pivotal in achieving bans in Europe³⁷, gathering organizations such as the National Association for the Defense of Victims of Asbestos (ANDEVA) from France, Asbestos Exposure Association (AEA) from Italy and the Comitato MAC Zero from Switzerland in the European Ban Asbestos Association.

Asbestos in Croatia Now

The Republic of Croatia, is a small southern European country that has only recently come out of a five-year war. The

country is going through hard times because of complex events such as rebuilding of the country and transition to an entirely new system of economy. Hence it is understandable that the asbestos-related problems have not been of primary concern for the last ten years. Nevertheless, they have been present, and we have been living with them all that time.

Actual law does not ban the import and the use of asbestos in the Republic of Croatia. The annual demand is about 4000 tons of chrysotile asbestos³⁸. It seems that developing countries are being recognized by asbestos companies as a inviting the transfer technologies from the first world. Croatia between 1945 and 1991 had a strong shipbuilding industry that used large amounts of asbestos. Asbestos-textile and asbestos-cement industry was also developed. Hence the heritage of occupationally exposed people who have already developed asbestos-related diseases or who are likely to develop them after the latent period which may last up to forty years. The consequences of past exposure become more and more obvious. Between 1995 and 1999, in one hundred and seventy people have been diagnosed asbestosis and recorded by the Croatian Institute of Public Health. Considering asbestos problems and solutions in the global context, Croatia has to adopt regulations on the use of harmful substances, human rights and environmental protection of the majority of European countries. It is a way for Croatia to avoid the threatening possibility to become a Third World country.

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SUDBINA ČUDESNOG MINERALA: SVJETSKA KAMPANJA ZA ZABRANU UPORABE AZBESTA

S A Ž E T A K

Azbest je termin koji označava skupinu prirodnih mineralnih vlakana koja se radare u mnogim dijelovima svijeta. To je jeftin materijal sa izvanrednim kemijskim i fizikalnim svojstvima koja ga čine gotovo neuništivim. Azbest je intenzivno korišten u industrijske svrhe tijekom 20. stoljeća. Nakon što se u svijetu pojavila spoznaja o štetnom djelovanju azbesta na ljudsko zdravlje, proglašen je najopasnijim mineralom što ga čovjek koristi. Žestok je industrijski zagađivač koji uzrokuje azbestozu, karcinom pluća, mezoteliom i promjene na pleuri. Unatoč preporukama WHO, usvojenim i poboljšanim kriterijima donesenim u svrhu zaštite čovjekovog zdravlja, te rastućoj mreži organizacija koje zagovaraju zabranu uporabe i korištenja azbesta na međunarodnoj razini, taj mineral se još uvijek koristi u mnogim dijelovima svijeta.