# CHRYSOTILE ASBESTOS

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On account of the continued controversy surrounding the use of chrysotile asbestos during the year, global asbestos demand is believed to have further contracted in 2002, forcing world production down to 1.97 Mt, a decrease of about 1.0%. This decrease is mostly attributable to the closure of production capacity in South Africa and in the United States, and to reduced production in Canada. Production in other countries such as Kazakhstan, Russia, Brazil and Zimbabwe is thought to have remained stable at 2001 levels.

**Chrysotile and its uses**

Asbestos is a generic name for naturally occurring minerals with the common characteristic of fibrous form. Included under this designation are minerals from the serpentine group namely chrysotile and from the amphibole group, which include crocidolite, amosite, anthophyllite, actinolite and tremolite. Of all these minerals, chrysotile is the least hazardous to human health and is essentially the only one currently extracted in the world. Because of its chemical and physical properties, such as high strength, incombustibility, resistance to chemicals, durability, and versatility, asbestos is an extremely useful material that has been, and still is being, widely used throughout the world. Some 90% of all chrysotile currently produced globally is used in asbestos-cement (fibrocement) products; 7% in friction products such as brake linings and clutch facings; and 3% in textiles and various other uses. Most low-density products such as sprayed asbestos insulation, which were linked to most of the diseases and mortalities caused by asbestos exposure in the workplace, have been prohibited since the 1970s.

**Consumption**

As most of the asbestos is used in the manufacturing of cement products for the construction industry, global consumption is largely concentrated in developing countries with large infrastructure projects. Other than Russia, which consumes about 60% of its production, Asian countries in general are the world's most important users, accounting for about 45% of global demand. However, influenced by the European asbestos ban, consumption in Asian countries decreased by about 10% compared to 2001. Pursuing the trend established in recent years, demand from Japan decreased further as a result of the depressed state of the economy and the Japanese manufacturing industry's gradual switch to substitute materials. Moving in the opposite direction, demand from China, Thailand, and Pakistan increased while that of other Asian countries either remained stable or declined slightly. For that matter, demand from the fibrocement product manufacturing industries in India, Indonesia, South Korea and Malaysia remained strong as these products are still considered the best cost-benefit construction material in hot and humid climates.

 

Consumption in the Middle East, mostly in the United Arab Emirates and Iran, and in Africa essentially in Algeria, Angola, Morocco and Senegal, accounts for about 20% of world demand. Import levels to these regions have, however varied in recent years as a result of social unrest and the influence of European policy changes.

Also influenced by tendencies in Europe and under corporate pressure to substitute chrysotile asbestos – as an important percentage of Latin American consuming companies are subsidiaries of companies headquartered in Europe – the Americas decreased its relative position but remained an important consumer of chrysotile, accounting for about 13% of world demand. Brazil, the world's fifth largest producer of chrysotile is the area's main supplier and user while Colombia, Cuba, Ecuador, El Salvador, Mexico, Panama and Venezuela each have a dynamic chrysotile asbestos manufacturing industry. Consumption in the US during the year fell to slightly more than 6,600 t compared to more than 10,500 t in 2001, on account of further substituting. However, demand is expected to stabilise at this lower level for the coming years, as the remaining uses for chrysotile are more difficult to substitute.

In Europe, which still accounts for 1% of global demand, the gradual compliance of countries to the European Union ban decision on chrysotile consumption led to a significant drop in imports in 2002 compared to 2001. The drastic change in demand registered during the year stems from Spain's switch to substitute fibres. Further decreases are still expected in the coming years as Portugal, the last remaining European Union consuming country, reluctantly complies with the EU ban directive by the year 2005.

**Production**

Pursuing the trend of recent years, Kazakhstan, Russia, Brazil and Zimbabwe took advantage of the devaluation of their respective currencies and of their low production costs to increase their market shares by edging out Canada (Table 1).

Russia, the world's largest asbestos producer, is estimated to have produced 750,000 t of chrysotile asbestos in 2002, an increase of 4.4% from 2001. The Russian chrysotile mining industry consists of three companies: Joint Stock Combine (JSC) Uralasbest, JSC Orenburgasbest, and JSC Tuvaasbest, who operate four open-pit mines located in the Urals (3) and in the Tuva region (1) north of Mongolia. An important portion of the country's production is for domestic consumption or is transformed before being exported. About 40% is exported as fibre concentrates while the rest is used to manufacture asbestos-cement products (80%) and technical products (20%) such as friction material products, thermal and electric insulation materials, etc.

In June 2002, the Russian Asbestos Association in collaboration with the Canadian Asbestos Institute organized an international conference on *Safety and Health in the Production and Use of Asbestos and Other Fibrous Materials* to update participants on the state of knowledge on asbestos and substitute fibres and to disseminate information on the safe and responsible

use of chrysotile asbestos. The importance of acquiring the cooperation of all stakeholders (employers-government-labour) to ensure the implementation of the safe and responsible use of chrysotile was highlighted during the event.

Chrysotile asbestos production in China is estimated at 360,000 t in 2002, mostly emanating from the country's western provinces of Xinjiang and Qinghai, and the eastern provinces of Liaoning and Hebei. This production is intended primarily for domestic consumption in the manufacturing of asbestos-cement products used in the development of the country's infrastructure. Asbestos consumption in China is expected to keep pace with the increasing construction activity that may result in an increase in imports.

The Canadian chrysotile industry, the world's third largest producer and the largest exporter, is concentrated in the province of Québec, in eastern Canada. Production comes from three mines: the Black Lake open pit and Bell underground mines operated by LAB Chrysotile, Inc. and the Jeffrey open pit mine operated by Jeffrey Mine Inc. In 2002, a seven-month lockout at the Black Lake mine, coupled with fierce competition for market share by other world producers and a contraction in demand following the adoption of regulatory restrictions by a number of countries, resulted in a 12.5% decrease in production compared with the previous year to 242,221 t.

As a result of financial pressure put on it by plummeting market demand and the costs associated with the development of an underground operation to extend the life of its mine, Jeffrey Mine Inc. filed for bankruptcy protection under the *Companies' Creditors Arrangement Act* on October 7, 2002. However, the permanent closing of the Jeffrey mine was postponed following the US' NASA space-shuttle programme offer of a multi-million dollar contract through ATK Thiokol Propulsion, for the supply of a special chrysotile fibre needed to manufacture thermal insulant for the space shuttle's solid rocket boosters.

Ever since the maiden launch of space shuttle Columbia in 1981, the Jeffrey mine has supplied material for the two giant solid-fuel re-usable rocket motors that boost each shuttle into orbit. The asbestos fibres protect the rockets' case from the burning fuel during lift-off. The NASA contract will enable the Jeffrey Mine to treat ore stockpiled at the mine to produce about 40,000 t of chrysotile fibres including about 590 tonnes of the high grade fibre 'plastibest' for NASA, enough to supply the shuttle's solid-fuel rocket systems until 2020.

In other developments in Canada during the year, the Government of the province of Québec adopted a policy for the increased and safe use of chrysotile asbestos. This policy will enable Québec to set an example and demonstrate to the world how to use the fibre safely. Products targeted for greater use in Québec include chrysotile-cement pressure pipes and structural tube supports for lighting purposes, fireproof paper for archiving, chrysotile reinforced plastics and chrysotile asphalt. This latter product has been used successfully in Quebec over the past years (120,000 t of chrysotile asphalt in 2001) and has proven its cost-benefit advantages.

Chrysotile asbestos production in Kazakhstan, the fourth largest world producer, comes from the Kostanai region where the JSC Kostanaiasbest operates the Dzhetygarinsk open-pit mine. Production in 2002 is estimated at 235,000 t, up from a level of about 200,000 t in the previous year. Taking advantage of its lower cost base the combine has more than doubled its production since 1998 and is even planning additional investments by 2005 to modernise its operations further.

Brazil's sole chrysotile asbestos producer, Sociedade Anonima Mineraçao do Amianto (SAMA), produced approximately 180,000 t in 2002, about 10% less than in 2001. Most of this production – on average 160,000 t – is consumed by Brazil's chrysotile cement manufacturing industry, while the rest is exported mostly to Latin American countries. SAMA's mine is located at Minaçu in the state of Goiás. At the regulatory level, two important national Brazilian bodies, the Federal Supreme Court and a House of Representatives Committee ruled in favour of maintaining the controlled use of chrysotile asbestos in Brazil.

On September 26, 2001, the Brazilian Federal Supreme Court had remanded the law of the state of South Mato Grosso that forbade the manufacture, entry, marketing and storage of all asbestos fibre for civil construction or for products made of asbestos by declaring it unconstitutional. Similar legislation formerly adopted in three other states: Sao Paulo, Rio de Janeiro and Rio Grande do Sul were all confronted with the same verdict.

In other developments, on October 15, 2002, a Brazilian Chrysotile Institute called *'Crisotila Brasil'* was formed by executives of the mining and fibre cement industry and the partnership of the Secretary of Industry and Commerce of Goiás, the National Department of Mineral Production, the city of Minaçu and the Union of the Workers of the Non Metallic Minerals Industry of Minaçu. The purpose of this agency is essentially to promote the safe use of chrysotile by disseminating information on the issue on domestic and international markets, and by stimulating and supporting studies and research related to the safe use of chrysotile fibres and its applications.

Asbestos production in the Republic of South Africa plummeted to 245 t of chrysotile fibres in 2002, as a result of the closure of the country's mining operations. However, as a result of drawdowns from stockpiles, sales slightly above 13,400 t were recorded including about 5,600 t for export. Production was provided in recent years by Msauli Asbes Beperk, which operated an underground mine and processing plant in the Barberton area of Mpumalanga, and by Kaapsehoop Asbestos and Stella Asbestos, who both operated smaller mines in the same area as above and supplied the local markets.

In Zimbabwe, despite political and economical instability during the year, production of chrysotile at the Shabanie and Mashaba mines reached about 135,000 t, a production level similar to that of the previous year. The company was also able to keep its sales at 2001's level, despite lower world consumption, on account of the devaluation of the country's currency.

In India, small-scale mining occurs in a number of states notably in Rajasthan and Bihar, which results in the annual production of about 20,000 t of asbestos. Other than from Canada and domestic mines, India's asbestos requirements are sourced mostly from Zimbabwe and Russia. Indian consumption of asbestos is nearly exclusively for the manufacture of asbestos cement products used by the construction industry, such as roofing sheets and pressure pipes for the transport of drinking water. Currently, there are about 75 plants engaged in the production of asbestos products across India. These are mainly located in the states of Gujarat, Karnataka, Madhya Pradesh and Andhra Pradesh.

The only US chrysotile asbestos producer, King City Asbestos Corp.'s New Idria mine near Coalinga, California, closed in 2002 as a result of declining markets for its fibre grade. Shipments from this mine amounted to about 3,000 t of chrysotile in 2002, down from about 5,260 t in 2001. US consumption of chrysotile asbestos fibre based on 2002 imports of 6,849 t and its domestic production was split in roofing products (71%), gaskets (18%), friction products (5%), and other products (6%). The US main import based on tonnage is asbestos-cement sheets, panels and tiles; while based on value its main import is friction products such as brake linings and pads. Total imports of asbestos products in 2002 were valued at US$556 million, about equal to that in 2001. US exports of chrysotile fibres, essentially to Japan and Mexico, increased by 34% to 6,554 t in 2002 while US exports of asbestos-containing products (mostly brake linings, mounted brake linings and other friction products), amounted to about US$205 million, down 32% from 2001.

Asbestos litigation – affecting some 8,400 companies – pursued its damaging effect on the US economy during the year by forcing additional companies into bankruptcy. The failings of the US judicial system were made apparent by the fact that most of the claimants involve people that were exposed to asbestos in one way or another but that have not developed a related illness, because such claims must be filed before statutory deadlines are reached.

The US Congress is under mounting pressure to address the situation, such as having medical criteria established for non-malignant asbestos-related illnesses, and exempting potential claimants from statutory deadlines for filing such claims until their condition meets the criteria.

At the regulatory level during 2002, the US Environmental Protection Agency (EPA) oversaw the development of a revised methodology for conducting risk assessments of asbestos to take into account the substantial improvements that have occurred since 1986 in asbestos measurement techniques and in the understanding of how asbestos exposure contributes to disease. The EPA's current assessment of asbestos toxicity, based primarily on an assessment completed in 1986, considers all mineral forms of asbestos and all asbestos fibre sizes to be of equal carcinogenic potency. However, the proposed risk assessment methodology distinguishes between fibre sizes and fibre types in estimating potential health risks related to asbestos exposure. It incorporates the knowledge gained over the past 17 years into the agency's

toxicity assessment for asbestos. EPA is scheduled to convene a peer consultation workshop in 2003 to seek input from a panel of experts on the scientific merit of the proposed methodology.

**Regulatory Developments**

Adopted on September 10, 1998, the **Rotterdam Convention** on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade is a multilateral environmental agreement jointly administered by the United Nations Environment Programme (UNEP) and the Food and Agriculture Organization (FAO) of the United Nations. The objectives of the Convention are:

- to promote shared responsibility and co-operative efforts among participating countries in the international trade of certain hazardous chemicals and pesticides in order to protect human health and the environment from potential harm; and
- to contribute to the environmentally sound use of those hazardous chemicals and pesticides, by facilitating information exchange, by providing for a national decision-making process on their import and export and by disseminating these decisions to participating countries.

This new tool will assist developing countries and countries with economies in transition better to understand and manage the risks associated with the use of toxic chemicals and pesticides. The PIC procedure currently covers 26 pesticides and five industrial chemicals, referred to as PIC substances. In February 2002, a decision was made to initiate the addition of all forms of asbestos to the PIC procedure. A committee proceeded to draft a Decision Guidance Document (DGD) on asbestos. This document will provide a summary of toxicological and environmental characteristics, known usage, possible exposure routes, measures to reduce exposure, and regulatory actions taken by countries to ban or restrict the use of asbestos. Chrysotile will be described in a separate chapter to distinguish it from other - more toxic - forms of asbestos. The DGD for asbestos should be completed in March 2003 and submitted, for approval, to the governing body of the Convention at its meeting in October 2003. If the DGD is accepted, chrysotile is expected to be subject to the PIC procedure starting in the Spring of 2004.

The implementation in the **UK** on November 24, 1999, of the European Commission Directive 1999/77/EC prohibiting the use, import and manufacture of chrysotile asbestos brought to the fore the issue of potential health risks associated with in-place asbestos products. To address this issue, the UKs Health and Safety Executive developed a law to force property owners to remove from their buildings all asbestos-based products, even asbestos-cement products such as roof tiles, before being able to sell their properties. However, mounting negative publicity highlighting the significant costs of removing asbestos products compared to the trivial benefits derived forced the UK Government to review its policy on the matter and postpone its entry into force.

**Outlook**

Battling a negative image it started acquiring in the 1960s, linked to the demonstrated cancer risk associated with exposure to high concentrations of asbestos dust in the workplace, the industry suffered further negative publicity in 2002 from ongoing asbestos litigation in the US. However, the ongoing debate concerning the absence of cancer risk at low-level exposure to chrysotile, and the growing evidence of the potential toxicity of the main substitute fibres may eventually change the industry's outlook.

Markets should experience a further resumption in demand in coming years as Asian economies gradually gain strength. More specifically, consumption in India and China is expected to remain strong in the short and medium term due to increased demand for infrastructure development. However, fierce competition from India's iron and steel industry may limit the growth in demand for chrysotile cement products in that country.

A further decrease in consumption is still expected in the coming years in Europe, as Portugal complies with the EU ban directive by the year 2005 and in Japan as its manufacturing industry gradually turns to substitute materials. Demand from the Americas should, overall, be stable at the 2002 level as lower US consumption is counterbalanced by increases in Argentina, Brazil and Peru. Similarly, consumption on the African subcontinent should remain at current levels in the short term.

In developing countries, the benefits of chrysotile-cement products continue to be recognised despite increasing competition from substitute fibres, PVC and galvanized steel. In particular, chrysotile-cement pipes are essential to the distribution of potable water and irrigation in many countries where aggressive soils and economic conditions are not appropriate for substitute products.

**Table 1:World Asbestos Production 2002 (t)**

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| Russia | 750,000 |
| China | 360,000 |
| Canada | 242,200 |
| Kazakhstan | 235,000 |
| Brazil | 180,000 |
| Zimbabwe | 135,000 |
| India | 20,000 |
| South Africa | 13,400 |
| Colombia | 8,000 |
| US | 3,000 |
| Others | 25,000 |
| **Total** | **1,971,600** |