Potential and Outlook

Asbestos resources are unlikely to be developed in New South Wales because of health hazards associated with its dominantly industrial use. Information on asbestos resources is presented because of the state's historical production and for completeness.

There are three main areas containing known asbestos occurrences and potential host rocks — namely the Great Serpentinite Belt (near Barraba), the Gordonbrook Serpentinite Belt (near Baryugil) and the Coolac Serpentinite Belt (near Gundagai).

Significant amounts of asbestos are present in the massive tailings dumps from past asbestos mining at Woodsreef near Barraba. There is ongoing assessment of the dumps as a potential source of magnesium metal (e.g. Pacific Magnesium Corporation Limited 2001).

Nature and Occurrence

There are six major asbestos minerals (Table 1), which all show fibrous or 'asbestiform' crystal habit. This is characterised by closely packed crystals or fibrils that have a large length to width ratio, unusual tensile strength and considerable flexibility. Asbestos fibres resist heat and chemical attack and are non-flammable.

Global resources of asbestos are estimated at 200 Mt (Virta 2005). Recent annual production has been around 2 Mt. The former USSR, Canada and China are among the leading producers. There are no operating asbestos mines in Australia.

Deposit Types

Deposits occur in regionally or contact-metamorphosed carbonate-rich and magnesium-rich rocks that have been faulted, folded or sheared. Ninety-eight per cent of all producing chrysotile deposits in the world occur in serpentinised peridotites and serpentinised carbonatites, usually associated with ophiolite complexes. Amosite and crocidolite occur in metamorphosed ferruginous sedimentary rocks, such as ironstone, quartzite and argillite, and account for about 2% of world production. Tremolite, actinolite and anthophyllite, which constitute a small fraction of world production, are associated with highly metamorphosed ultrabasic rocks.

Table 1. Main asbestos minerals

Mineral	Formula	Characteristics	Occurrences
Actinolite	$Ca_2(Mg,Fe^{2+})_5Si_8O_{22}(OH)_2$	Long-bladed crystals, fibrous or thin columnar aggregates	Contact and regional metamorphosed dolomite, magnesian limestone, low-grade ultrabasic rocks
Amosite	$(Mg,Fe,Mn)_7[Si_8O_{22}](OH)_2$	Variable fibre length, and a coarse texture	Contact and regional metamorphosed iron-rich rocks
Anthophyllite	$(Mg,Fe^{2+})_7Si_8O_{22}(OH)_2$	Massive fibrous or lamellar; short harsh poorly flexible fibres	Metamorphosed schists and gneisses or metasomatic rocks
Chrysotile	$Mg_3Si_2O_5(OH)_4$	Fibrous	Veins and veinlet and stockworks in serpentinite
Crocidolite	$Na_2Fe_3^{2+}Fe_2^{3+}Si_8O_{22}(OH)_2$	Short to long flexible fibres	In granite, syenite, rhyolite, trachyte, banded ironstone, regionally metamorphosed schists
Tremolite	$Ca_2(Mg,Fe^{2+})_5Si_8O_{22}(OH)_2$	Long-bladed crystals and short and stout crystals, fibrous or thin columnar aggregates	Contact and regional metamorphosed dolomite, magnesian limestone, low-grade ultrabasic rocks

Source: Modified after MacNevin (1970)
Note: Crocidolite, 'blue asbestos', is the highly fibrous variety of riebekite.

Main Australian Deposits

The main Australian asbestos deposits are in Western Australia and New South Wales. In Western Australia the deposits at Lionel and Nunyerry were mined until the 1960s and produced chrysotile asbestos from Archaean serpentinite. The Wittenoom Gorge deposits produced crocidolite asbestos from Proterozoic banded iron formations.

New South Wales Occurrences

Of thirty-three substantial occurrences of asbestos in New South Wales, nineteen occur in the New England region, with the remainder in the Central West and Far West regions of the state (MacNevin 1970, 1975; Ray et al. 2003).

The major source of asbestos in New South Wales was the Woodsreef deposit in the New England region. This was mined until 1983. The orebody occurs in the Great Serpentinite Belt and is hosted by a fault-bounded layered peridotite–dunite complex adjoining Devonian sedimentary rocks. The chrysotile is present mainly as a stockwork of cross-fibre seams. The Great Serpentinite Belt also hosts a number of smaller deposits, of which Spring Creek near Cooplacurripa is the largest.

Deposits also occur in the Gordonbrook and the Coolac Serpentinite Belts, which are ophiolite complexes like the Great Serpentinite Belt. In the Gordonbrook Serpentinite Belt, chrysotile asbestos has been mined at Baryulgil. Deposits have been explored at Yulgilbar and at Fine Flower (Clarence River Exploration Limited 1977).

Tremolite asbestos was mined around 1900 at the Jones Creek workings in the Coolac Serpentinite Belt, northwest of Gundagai. Small occurrences of chrysotile asbestos in veins have been recorded in the southern parts of the Coolac Serpentinite Belt.

Minor quantities of asbestos have also been mined from metamorphosed mafic rocks and limestone near Orange, Rockley, Newbridge, Wellington and Broken Hill.

Applications

Asbestos minerals form flexible fibres that are chemically inert and heat resistant, have a low thermal conductivity, resist wear and disintegration, have high electrical resistance, and provide structural strength. These properties make asbestos useful for a variety of applications — such as fire-proofing, insulation, textiles, filter material, friction products and asbestos-cement products used in the construction industry.

The fact that asbestos has been classified as extremely hazardous and even banned in some countries has meant that decreasing amounts of asbestos are used and alternative products are sought for these applications wherever possible. These include materials such as fibreglass, carbon fibre, non-fibrous minerals such as wollastonite, talc, limestone, ductile iron and polyvinyl chloride (PVC).

Health Issues

All asbestos minerals are now recognised as hazardous or potentially hazardous to health, primarily causing asbestosis (lung disease) and mesothelioma (rare form of lung cancer). Exposure limits and restrictions on the use and handling of asbestos and products containing asbestos have been imposed in most developed countries.

Economic Factors

Because of the health and environmental risks, markets for asbestos are declining rapidly and irreversibly.

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