

## China

In the People's Republic of China rapid industrialization and economic growth have generated an almost unquenchable thirst for asbestos. Although it has consistently remained amongst the world's top five asbestos producers over recent decades,<sup>10</sup> domestic output does not satisfy national demand.<sup>11</sup> Imports of asbestos rose nearly 150-fold from 1,083 t (1990) to 145,425 t (2003); 82% of imports come from Russia.<sup>12</sup> China is the world's number one user of asbestos with an annual consumption of up to 537,000 t;<sup>13</sup> national consumption increased by 40% between 2000 and 2004. The majority of asbestos goes into the production of asbestos-cement building materials with the remainder being used for friction products, textiles and insulation products.

One hundred thousand people in China are exposed to asbestos at work including 24,000 in mining (15,900 in 17 state enterprises and the others in 102 collective enterprises) and 46,000 in more than 1,200 asbestos factories. Table 1 lists the 10 biggest chrysotile-consuming factories in China in 1996, according to data published in 2002 by Drs. Feng, Liu, Zhang and Pan.<sup>14</sup>

Some asbestos factories are located in heavily populated areas.

As a rule, conditions are worse in small-scale units than in large state-run facilities. Smaller workplaces are described as having:

"limited capital and human resources, lower educational levels, poor regulation, and a great lack of awareness of occupational health and safety on the part of both owners and workers. Workers in these industries are more likely to be exposed to higher levels of dust without necessary protective measures. In most cases, these workers have little access to both occupational medical care and primary health care."<sup>15</sup>

Experts report "serious occupational health failures... (and) an institutionalized aversion to worker participation in safety issues" in small-scale industrial units throughout rural China; in a paper published in 2000, they reported widespread flouting of health and safety legislation:

"Of the 29,246 enterprises studied in this effort, 8.7% have set up some kind of organization to deal with the subject of occupational health... During this study it was found that of 1780 enterprises with hazardous working conditions, only 42% had any kind of ventilation equipment... Very few enterprises had health clinics for their workers. Medical insurance was not paid by 60% of the employers. No compensation of any kind

**Table 1: Top Ten Asbestos Product Factories in China**

Name of Factory	Location	No. Workers	Production capacity (t/yr)
Hangchen Friction Materials	Hangzhou	1010	8000
Liuhe Asbestos Products	Heilongjiang	*	6000
Changchun Asbestos Products	Changchun	*	6000
Beijing Brake & Sealing Materials	Beijing	*	5000
Nanjing Friction Materials	Nanjing	*	4000
Hubei Friction & Sealing Materials	Wuhan	2000	4000
Chongqing Asbestos Products	Chongqing	1413	3000
Qingdao Asbestos Products	Qingdao	*	3000
Shenyang Friction Materials	Liaoning	1200	3000
Shanghai Asbestos Products	Shanghai	*	3000
*not known			

was given to workers with occupational injuries or illnesses in 11% of the enterprises. Only a very small fraction of employers fully cover their employees' medical expenses and compensate the occupational injuries and diseases at the level provided by state-run enterprises."<sup>16</sup>

The compliance rate with the Chinese occupational asbestos standard at the 12 monitored worksites where asbestos was being used was 0%; in other words, not one of the asbestos workplaces was operating within legal parameters. Even at asbestos-using enterprises run by the state in urban locations, hazardous asbestos concentrations commonly occur during the manufacture of asbestos-containing products, especially in areas where raw fiber is handled, or where asbestos textiles, ropes or brakes are being made.<sup>17</sup>

In chrysotile mines, dangerous conditions are routine with the highest levels of airborne asbestos being found in the oldest mines<sup>18</sup> and in some family-run enterprises; these levels can reach up to 50-150mg/m<sup>3</sup>. There are many small asbestos mines in rural areas where conditions are particularly horrendous; traditionally the initial sorting of asbestos fibers was carried out by peasants working at home.<sup>19</sup> In 1995, a report substantiated by U.S. Customs revealed the mining of asbestos at the Xinkang prison camp, Sichuan Province by inmates routinely working 15 hours/day with no protective equipment. Asbestos dust concentrations are lower in modern mines where dust exhaust systems are in place; however, elevated levels can still be found in areas where raw fiber is being processed. Bearing in mind that in China, there is a "clear distinction between the theory of occupational health and safety and its practice,"<sup>20</sup> the existence of the Occupational Exposure Limit (OEL) Value is no guarantee of worker protection either in the mines or factories. While the incidence of some types of occupational



lung disease seems to be decreasing in the cities, it is increasing in newly industrializing rural areas where "hazardous agents are poorly controlled, and occupational health services and medical care are lacking or insufficient."

Despite the fact that asbestos-related lung cancer and mesothelioma induced by occupational exposure have been recognized as statutory occupational lung diseases in China since 1990, only limited data are available. By the end of 2003, 7,907 cases of asbestosis, of which 923 were fatal, had been registered; this represented 1% of all pneumoconiosis cases. According to some epidemiological studies, more than half of all asbestosis patients had pleural plaques as did 15% of at-risk workers. The burden of occupational lung cancer in China remains ill-defined despite investigations of the link between asbestos exposure and lung cancer:

"A nation-wide cohort study reported the mortality experience of 5,893 asbestos workers in eight asbestos factories, in which chrysotile asbestos was used to produce textile products and construction materials. One hundred eighty-three cancers (including 67 lung cancers) out of 496 deaths were observed with the relative risk (RR) of 5.3 ( $p < 0.01$ ) and a standardized relative risk of 4.2 ( $p < 0.01$ ) for lung cancer. There was a synergistic effect between cigarette smoking and lung cancer, but the risk of lung cancer produced by asbestos exposure was found to be twice as high as that produced by smoking. Another study also reported higher mortality from lung cancer among nonsmoking female chrysotile workers (Obs:Exp = 6:0.88). A recently reported prospective cohort study using more sophisticated analysis methods observed RRs of 6.6 for lung cancer and 4.3 for all cancers in a group of workers who were exposed to chrysotile alone."



A survey of 5,681 female manual asbestos weavers in the textile industry in Cixi City, Zhejiang Province found a lung cancer death rate 3.88 times higher than the control group. One hundred and forty-four women died from malignant tumors, with 74 deaths from lung cancer. It is of relevance to note that the cohort was exposed only to chrysotile asbestos.<sup>21</sup> A study of 1,472 asbestos mineworkers found that their mortality from malignant tumors, and even more so from lung cancer, was significantly higher than that for coal miners.

As of 2002, few cases of mesothelioma had been diagnosed; among 10,000 asbestos product workers and

6,200 asbestos miners in one cohort study, only 4 cases of mesothelioma were observed. Drs. Fen, Liu et al reported that:

"The mortality due to mesothelioma in three cities of Liaoning province was 1.5 to 3.7/10<sup>5</sup> during 1992-2000, and the incidence was 4.7 to 8.4/10<sup>5</sup> during 1998-2000. A national survey showed that the mortality by (sic) mesothelioma was 1.6/10<sup>5</sup> and 1.2/10<sup>5</sup> for the citizens of five major cities and two counties (1988-1992), and the morbidity was 3.1/10<sup>5</sup> for the citizens. Based on the limited data available, it is estimated that annual deaths due to mesothelioma in China were about 1,500 in 1990. This is probably a conservative estimate considering the incomplete cancer registry systems and diagnosis levels in China."

Since the 1980s, government research has been conducted into the use of non-asbestos substitutes for cement, friction and sealing materials and, more recently, for heat insulation. Officially, the Government encourages technological innovation and the replacement of toxic substances by safer substitutes; it has closed down some facilities engaged in the smelting of arsenic, mercury, lead and zinc, pesticide production, electroplating, gold-selection and oil refining. Since 1994, the import and export of crocidolite has been banned; in 2001, the mining of crocidolite was forbidden and in 2002 the use of crocidolite was prohibited in building materials. From October 2003, the use of all types of asbestos was banned in the production of friction materials for the automotive industry. Laws to improve occupational health and safety introduced in 2002 include: the National Law on the Prevention and Control of Occupational Diseases, the Law of Safe Production, the Law Promoting Clean Work and the List of Backward Production Capacity, Technologies and Products (3rd revision). It is unlikely that these regulations are being enforced judging by long-standing failings of the health and safety inspectorate which is plagued by "understaffing, poor technical capacity, and widespread corruption."