

A painting of the Taj Mahal and a mountain range. The Taj Mahal is on the left, rendered in shades of blue and white. To the right is a large, craggy mountain peak with yellow and white highlights. The sky is a mix of white and grey, suggesting a cloudy or overcast day. The foreground is dark and indistinct.

INDIA'S ASBESTOS TIME BOMB



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Edited by David Allen and Laurie Kazan-Allen



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About IBAS

The International Ban Asbestos Secretariat (IBAS) was established in 1999; it is an independent non-governmental organization which has two objectives: a worldwide ban on asbestos and justice for all asbestos victims. IBAS monitors, analyzes and disseminates news received from the ever-expanding network of individuals and groups involved in the international movement against asbestos, as well as information from legal, medical and industry sources. IBAS produces written material and organizes conferences to raise the profile of asbestos issues.

The work of IBAS is coordinated by Laurie Kazan-Allen.

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THE GRIM REALITY

“Everything I have in my life is due to (my employer) Saint-Gobain including my lung cancer.”

Asbestos cancer victim, Sebastião Aparecido Alves da Silva, Brazil

“I used to be an athlete once, now if I even walk a little faster or climb a few flights of stairs, I am breathless. I can’t even run a few paces.”

Asbestosis sufferer, Ravindra Ganpat Mohite, India

“The pain is very strong, it [is] right through my chest and between my shoulders. I feel like an empty vessel which does not have lungs and a heart inside.”

Asbestos sufferer, Lenora Lands, South Africa

“I loved my father, but I hate asbestos.”

Ms. Kazumi Yoshizaki, daughter of Japanese mesothelioma victim

“I have lost my father, mother and one brother to asbestos cancer; of the rest of our family, one brother is battling mesothelioma and I have pleural plaques. My other two brothers appear, for the time being, free of any sign of asbestos-related disease but the sword of Damocles hangs over us all.”

Eric Jonckheere, family member, Belgium

“My husband Alan paid the ultimate price for his exposure to asbestos – his life. One life lost to an asbestos-caused disease is tragic; hundreds of thousands of lives lost is unconscionable.”

Mrs. Linda Reinstein, U.S.

“Asbestos diseases and asbestos cancers claim hundreds of thousands of lives each year. They are not legal inconveniences, political obstacles or financial statement entries. They are death and suffering incarnate.”

Dr. Michael R. Harbut, U.S.

“I started with 25 (fellow workers). There’s two of us left, the others are dead with asbestos. The graveyard is full of my (trade union) members. I have a black tie I constantly wear, attending funerals of asbestos cases.”

UK asbestos worker and trade unionist Joe Cowell



I was 21 years old when I joined the workforce of Hindustan Ferodo's Ghatkopar factory in the north of Mumbai (1973). I worked there for 33 years until 2006, when the factory, now called Hindustan Composites Limited (HCL), was closed down and workers were compelled to take early retirement under a voluntary retirement scheme.

My brother used to work for HCL and suggested that I get a job at the factory. I did not have any idea of the factory or what it manufactured. When I started, I was given the job of maintaining the machinery in the asbestos textile manufacturing section. There were two machines with 116 spindles and my job was to ensure that these machines operated smoothly. Our section produced yarns of polyester interweaved with asbestos fibers for making fire resistant textiles.

When I started work at the factory, neither I nor my colleagues knew anything about asbestos or its health effects. But during the course of our work, we noticed warning labels about dangers on drums and bags. Company officials did not tell us anything about the dangers of asbestos or the safety measures we needed to protect ourselves from hazardous exposures. It was only in 2004, 31 years after I started working with asbestos, that I came to know about the health impact of asbestos, through an initiative of our Union

and a health check-up at the factory gate by members of the Occupational Health and Safety Centre. The factory management never told us anything. There were periodic health check-ups conducted by the company, which were done frequently earlier, but later infrequently. No data or diagnosis reports were ever shared with us. The company doctors looked at our health reports and X-rays 6-7 months after the check-ups or tests were done and never told us anything.

Although we were not told about the harm of asbestos, we were sometimes given cotton masks to wear. There was no air suction machine fitted in the production unit to remove dust. Our workplace used to be very dusty and workers were always covered with a layer of white dust. Now I know that many of us were exposed to dangerous levels of asbestos fibers while working in the factory due to poor working conditions. I know of at least 20 of my co-workers who died in their 50s. One of my colleagues died of cancer; he was in his 40s. There are two more that are now battling with throat and lung cancer. I used to be an athlete once, now if I even walk a little faster or climb a few flights of stairs, I am breathless. I can't even run a few paces. I was diagnosed with asbestosis during the 2004 factory gate medical check-up.

Neither HCL nor the government has done anything to help the injured workers who were exposed to asbes-

tos. While the company flatly denies the occurrence of such exposure, the Government has never stepped in to do anything beneficial for the workers. Moreover, a case filed by our Union on behalf of 36 exposed workers in 2005 in the Court is being indefinitely delayed and in the last three years only 7 to 8 workers have been cross examined.

I took voluntary retirement in 2006 after fighting the company's illegal closure of the Ghatkopar factory. I have a family of four to support. The money I got through voluntary retirement is my only source of income.



In 1965, I joined Ahmedabad Electricity Corporation (now known as Torrent Power) as a casual worker. I was given a job as helper in the boiler room of the company.

I am an illiterate person. I come from Chandkheda, a small village near Gandhinagar. I was 25 years old when I came to Ahmedabad city looking for work. We had a large family and needed to support them. So I took the first job I got.

My job was to assist the skilled masons in the boiler room who did the insulation work on boilers. We used to remove or add the white insulation material packed around the boilers. There were 10-15 casual workers working with me in this section. In 1980, I was given permanent job status in the factory.

When I joined the company, I and my co-workers had no knowledge of asbestos or its effect. No one ever told us anything about it. Certainly the company did not. The only thing we knew was our factory generated electricity from coal. In fact, we used to casually handle the "white material." Due to poor maintenance in many places the insulation lining was exposed. We used to playfully throw handfuls of this "white material" at our co-workers.

The company never gave us any training for safety or protection. And as a casual worker, you cannot even ask for anything, your job is very insecure. Casual workers are treated very badly,

given low wages and the most dangerous kinds of jobs in factories. They are not allowed to even unionize.

For the first 15 years of my job in the factory, while I was a casual worker, I did not get the benefit of medical check-ups that the company conducted every 2-3 years for permanent workers. After I became a permanent worker, there were medical check-ups done, but I and my colleagues never knew what the company doctors did with our reports or what were the findings. In 1990, I started developing breathing problems. I could not lift heavy objects, working, walking, talking everything became a problem. Every breath I took was painful. The company did a health check-up and said I was fine, there was no problem with me. Then why can't I breathe properly, why does it hurt so much? I did not understand.

I went to Raghunathbhai Manwar, a trade union representative in our factory, who took me to see a retired doctor, Dr. Arthur C. Clarke. They told me about asbestos and its effect on workers who get exposed to it. Dr. Clarke helped me to get a proper diagnosis of my medical condition; he also did health check-ups of my co-workers. Raghunathbhai helped to identify other workers in a similar situation. We learned we had a disease called "asbestosis." We did not know what it was, but understood that we have got this disease because of that "white material" we worked

with. Finally, in 1995 I had to quit work in the boiler room due to my failing health and started working in the office on menial jobs.

In 1996, a lawyer named Rani Advani from the Consumer Education and Research Centre helped 8 of us, who were diagnosed with asbestosis, file a case in Gujarat High Court for compensation. The Court ordered the National Institute of Occupational Health to examine us. Two of the workers died before the NIOH could examine them. Two of us were diagnosed with asbestosis by the NIOH. While the High Court kept deliberating our case, my colleague Kishan Goplani died. The court ordered an interim compensation of Rs10,000 (US\$ 250) be paid to me in 1997.

Meanwhile my failing health, need for medical attention and on top of that my inability to do any work was putting a lot of burden on my family. They threw me out of my own house. So I started begging near Ramji Temple to support myself. From an able-bodied worker, I was reduced to an infirm old man.

In February 2008, I received Rs160,000 (US \$4000) from the company as an out-of-court settlement. I guess I was lucky to get this money. But many of my co-workers, at least 15-20 of them, who were with me in the boiler room, were not. They died quietly, painfully and in penury.



Laurie-Kazan Allen,
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Historically the burden of industrial pollution has reached the developing world much faster than the fruits of industrial growth," writes Dr. Sanjay Chaturvedi. This statement is well illustrated by the evolution of the asbestos industry in India. In the frantic rush for economic development, there has been a pervasive lack of concern for the health of workers and the contamination of the environment. Sacrificing the lives of the few for the "good" of the many, the Indian Government has knowingly colluded in this sad state of affairs.

"It cannot be disputed that no development is possible without some adverse effect on the ecology and environment ... The comparative hardships have to be balanced and the convenience and benefit to a larger section of the people has to get primacy over comparatively lesser hardship."¹

Elected representatives and civil servants have been encouraged to turn a blind eye to "Dickensian" working conditions thereby exposing generations of workers to the debilitating and deadly diseases caused by asbestos.²

Research conducted for this monograph has revealed that between 1960-2006, 4.8 million tonnes of asbestos were used in India;³ although data is unavailable for 2007-2008, based on figures from 2006, it is not unreasonable to estimate that cumulative asbestos consumption in India between 1960-2008 will top 5.5 million tonnes.⁴ As there is no safe level of exposure to asbestos and as even minimal precautions have been lacking, phenomenal numbers of workers have received hazardous exposures. The fallout from India's asbestos mining and processing will be measured in lives lost, communities blighted and infrastructure contaminated. National and state governments in India maintain a stony silence on the collateral damage caused by the widespread use of asbestos; virtually nothing has been done to quantify the effects of environmental pollution in the wider community. The objective of this monograph is to give the people working on these issues the opportunity to present the evidence they have collected; the papers which follow constitute a damning indictment of a government that has prioritized the interests of the corporate sector above all else.

Decades of Economic Growth and Hazardous Exposures

Things could have been very different. India's commercial exploitation of asbestos began in earnest in the 1970s. Over the next 30 years, national usage grew by nearly 300%. That this industry was allowed to flourish at a time when the occupational, environmental and domestic hazards of asbestos exposure were firmly established is scandalous; that the Government of India made no attempt to track the health effects of asbestos use on at-risk workers is unforgivable. Companies like Turner & Newall, Hindustan Composites, Visaka Industries, Eternit Everest, Hyderabad Industries, Utkal Asbestos, Ramco Industries and others

have profited from the manufacture of asbestos-containing products in India. As the authors of the prefaces which precede the introduction point out, employers did not inform their workforces of the nature of the raw material they were handling; neither did they provide protective clothing or equipment. The situation in asbestos textile manufacturing is described as follows by Ravindra Ganpat Mohite: "company officials did not tell us anything about the dangers of asbestos or safety measures that we need to take to protect ourselves from exposure."

In the power stations things were no better according to Mangabhai N Patel:

"When I joined the company, I and my co-workers had no knowledge of asbestos or its effect. No one ever told us anything about it. Certainly the company did not... The company never gave us any training for safety or protection."

Despite the reassurances of industry stakeholders that asbestos is being used "safely under controlled conditions," living with asbestos in India is a "dangerous existence" according to the paper by Anup Srivastava and Vipul Pandya; these authors highlight the risks to "millions of construction workers who may be exposed during maintenance, renovation and demolition activities in buildings that contain asbestos." P. Madhavan's graphic photographs confirm that hazardous conditions continue in today's workplaces while Nick Clarke's discussion of the fallout from the increasing use of asbestos-cement roofing material in India leaves the reader in little doubt as to the capacity this material has to liberate fibers in domestic settings, especially urban slums.

The Indian Government has been guilty of malign neglect in its failure to act on the asbestos hazard. Long after the health consequences of occupational exposure were known, asbestos dust counts of up to 15f/cc were recorded at Hindustan Ferodo, a British-owned company that produced asbestos textiles, jointings, millboard and brake linings in Mumbai (1978). Footage of this factory which appeared in a landmark television documentary showed clouds of asbestos dust emanating from the plant "contaminating the streets and railway tracks around the factory." A factory worker described extremely dusty conditions in the carding department: "while the machines were in operation the dust would fly and at the moment they were stopped, they would sweep out the dust and collect it to one side, with their hand... the naked hand. Just be swept up."

In the "golden corridor" of Gujarat State, occupational exposure to asbestos has been a routine occurrence for decades in a multitude of industrial sectors: power generation, ship-breaking, production of cement, insulation, chemicals, pharmaceuticals, friction materials and safety equipment. Examples of ignorance and superstition emanating from this situation are legendary such as the comment by one Chief Inspector of Factories who said that workers in Gu-

"while the machines were in operation the dust would fly and at the moment they were stopped, they would sweep out the dust and collect it to one side, with their hand... the naked hand. Just be swept up."

Mumbai factory worker

jarat were immune to asbestos: "Had it not been so," he said "large numbers of workers in Gujarat would have died of asbestos looking at the poor work conditions in Gujarat." State officials believe that Gujarat residents receive divine protection: "God is here in Gujarat... (if workers and industry) believe in God, trust in God and work with God, then production, health and safety would be in a good condition." In her paper "Monitoring" *Environmental Pollution and Asbestos Exposure in Gujarat*, Dr. Linda Waldman explains:

"Having spirituality means that, even if unsafe conditions prevail, the workers will be 'well aware' and accidents will not happen. Telepathy and sensors in their bodies will enable workers to guess that something is going to happen and to take preventative action. Following this line, some State doctors argue that the majority of illness is psychosomatic and stems from the stressful conditions workers experience. But if they can achieve a mental balance and supreme energy from their spirituality, then they will be in a much better position to deal with this. Termed 'Disaster Management with a new and unique approach,' this approach means that workers are themselves to blame for their illness and therefore should seek compensation through their beliefs and increased religious piety."

If one were to subscribe to the religious technique of disaster management as described previously, then faith must be lacking in the country's ship-breaking yards as asbestosis is rife amongst the workforce, many of whom "are migrant and casual workers driven by poverty to the Alang yards." India has attracted widespread condemnation for its willingness to import hazardous waste contained on board redundant ships, such as the Blue Lady and the Riky. By doing so, they not only expose ship-breaking workers and their families to a cocktail of toxins including asbestos, PCBs and radioactive waste, but also jeopardize the health of local people such as the 30,000 villagers in Gujarat's Bhavnagar district who have the misfortune to live in close proximity to Alang.

Miners and workers from asbestos processing units and factories in Rajasthan and Maharashtra have elevated levels of asbestosis and obstructive lung disease from occupational asbestos exposures. As described in the paper *Health Hazards Due to Asbestos Exposure in India*, Dr. Qamar Rahman observed the use of obsolete technologies, a total lack of protective clothing or equipment, poor housekeeping practices and "little concept of the proper disposal of asbestos waste" at workplaces she inspected whilst conducting a survey for the Central Pollution Control Board.

Medical Failures: Ignorance Compounded by Bias

India's medical community has not covered itself in glory in its treatment of patients with asbestos-related disease. According to Dr. Murlidhar:

"'Occupational Health' is taught as part of the much-maligned subject of Community Medicine, and students rarely have access to standard ILO radiological plates, mandatory for asbestosis diagnosis, even in the top medical colleges... there is no postgraduate degree on occupational health available at any of the major medical colleges... Consequently, even a first-ranking radiology physician, lacking the expertise to diagnose asbestosis unambiguously, may

be compelled to certify an X-ray as normal when it is not."

In Gujarat this certainly happens, as shown by a case reported by Jagdish Patel in his paper *The Struggle against Asbestos-Related Diseases in Gujarat*. Workers with suspected asbestosis were adjudged to be able-bodied by the Employees State Insurance Corporation (ESIC),⁵ a contributory health insurance scheme tasked with treating and compensating injured workers. When asked by the Supreme Court to clarify the criterion used to arrive at this finding, an ESIC spokesman explained "that since they had neither expertise nor any equipment to diagnose asbestosis, they issued 'fit to work' certifications." The failure of medical professionals to issue asbestos-related diagnoses, which constitutes a major roadblock to victims' attempts to obtain compensation from negligent employers, is due to multiple factors including class bias and pressure from industry and/or government to downplay the incidence of occupational illnesses by misdiagnosing asbestos-related diseases as tuberculosis or bronchitis.⁶

Company screening programs consisting of periodic X-raying of selected parts of the workforce did nothing to safeguard workers' health. Test results and health reports were nearly always withheld from workers. As far as one employer was concerned (Turner & Newall), the results of the X-rays were considered "the property of the management." In his paper, Dr. Tweedale relates the story of one Indian chest physician who:

"recalled reviewing Hindustan Ferodo films in the late 1980s and found that up to nearly a third had lung damage consistent with asbestos exposure. When he tried to take it up with the company he was told his diagnoses were wrong. It was reported that court action against the company had been totally ineffectual."

Discussions with workers from the Hindustan Composites factory were reported by Dr. Rakhil Gaitonde and Madhuma Dutta who confirmed the futility of corporate medical check-ups:

"chest X-rays and medical examinations were performed every year, they (workers) were never told of the significance of these procedures, nor were they given any results. They told us that in the early days (1960s and 1970s) chest X-rays were done even every six months and for every one without fail, but as time went by especially after the 1990s, the whole system became haphazard; if you were not present on the given day you might go without an X-ray for the entire year. It seems that the company was providing the X-ray facility to satisfy bureaucratic demands – not out of any genuine concern for the workers' health."

So much for in-house corporate healthcare at asbestos factories.

Information Black Hole: No One Knows, No One Cares

It is hard to believe that in a country with such a sophisticated judicial system, where public interest litigation to establish the rights of asbestos workers can be brought before the Supreme Court, the lack of data on asbestos-related diseases can be anything other than intentional. As Dr. Sudhakar Kamat reports in his paper *Asbestos-Related Disease in India*:



"Although mesothelioma and asbestos-related lung cancer are recognized around the world, in India neither one of these diseases is commonly reported. This is not surprising as in India, cancer is not a notifiable disease. While there are some regional cancer registries, poor data collection and inadequate death certificate registration combined with other factors result in a spectacular underestimate of asbestos-related cancer. According to data from regional cancer registries in India, between the years of 1993-1997 there were a total of 56 mesotheliomas."

As there is a powerful interaction between exposure to asbestos and cigarette smoking in the causation of asbestos-related lung cancer and as there are 120 million smokers in India, the continued use of asbestos, an acknowledged carcinogen, is no doubt contributing to a massive loss of life in India.⁷

In his discussion about *The Difficulties in the Diagnosis of Asbestosis in India*, Dr. V. Murlidhar points out that:

"Like many chronic occupational diseases asbestosis exists in a climate of uncertainty, concerning exposure controls, diagnoses and assessment of disability. Exposure limits and disability assessments are often influenced by socio-political factors, while reliable diagnoses depend on access to suitable diagnostic tools and appropriate training of clinicians. There is frequently uncertainty about the precise source of asbestos exposure, and about the nature and speed of the disease processes – despite the public perception that medicine is an exact science. This uncertainty is compounded by the lack of a clear regulatory framework and the lack of understanding among concerned parties about the limited legal regulations."

If those who contract these diseases are not counted, does their suffering count? Does anyone care about them or the bereaved families they leave behind? That former employers don't care can be surmised by their failure to pay compensation; that the government doesn't care is evinced by its failure to even acknowledge their existence.

Compensation Process: Too Little, Too Late!

Despite High Court rulings, Supreme Court orders, grassroots campaigning and detailed legislation, obtaining compensation for an asbestos-related disease in India requires the stamina of an Olympic athlete and the patience of a saint; qualities lacked by people experiencing shortness of breath and severe pain on a daily basis. Overcoming the formidable hurdles to obtaining an accurate diagnosis however is child's play compared to surmounting the barriers blocking access to compensation. Successful claimants are few and far between; those who manage to navigate their way through the system receive paltry sums:

- ◆ Rs 10,000 (then around \$800) in 1984 for the death of Sri Dhiraj Sonaji, a worker in an asbestos-cement factory;
- ◆ Rs 170,000 (\$4,250) paid by instalments of Rs 10,000 in 1997 and Rs 160,000 in 2008 to Mangabhai Patel, a former power plant worker incapacitated by asbestosis;
- ◆ Rs 150,000 (then \$4170) in 1996 to the daughter of the late Kishan Goplani, who had worked at the Ahmedabad Electricity Company.

In Gujarat, the ESIC has compensated eight individuals for asbestos-related disease, all of whom were workers at Digvijay Cement; not one claim for these diseases has been paid out in Gujarat under the Workmen's Compensation Act. The intransigence of asbestos companies when it comes to compensating those they have injured is well known. The Manager of the Ghatkopar plant of Hindustan Composites wrote to a trade unionist:

"the conclusions drawn by you, that workmen listed are affected by asbestosis are far fetched, not supported by sound medical inferences and are with certain motives.... The company has qualified Medical Practitioners for regular check ups and maintains the records as per the rules and regulations as laid down by the Directorate of Industrial Safety & Health."

The Fix is In: Industry Control of the National Asbestos Debate

The economic interests of India's asbestos industry are furthered by strategies well-honed by international tobacco companies, including the use of industry propaganda, the commissioning of junk science masquerading as "scientific research" and personal and professional attacks on critics. It is ironic that even as big tobacco provides a role model for asbestos moguls, the synergistic effect of combining tobacco and asbestos is condemning many Indians to an early grave. A sustained and nationwide disinformation campaign designed to protect the asbestos sector from adverse publicity and unwelcome regulation has been ongoing for decades. Turner & Newall, the British-owned company which "led the way" in opening up asbestos markets in India, drew on its experience at home to advise company officials in Mumbai (1937) not to introduce dust control in the factory as to do so might create suspicions: "once the word gets around that asbestos is a dangerous occupation, it may seriously affect our labor force at some future date."⁸ As in the UK, Turner & Newall executives lied to factory inspectors in order to "avoid tiresome regulations and the introduction of dangerous occupation talk." The depth of concern asbestos executives had for their workers is revealed in a statement made by T&N's Chairman Ralph Bateman in 1971:

"in many of these (developing) countries the life expectancy is so low... that the question of the very, very small risk of mesothelioma that may exist in exposure to asbestos in some situations, is totally outweighed by the contribution that asbestos pipe and other products can make..."

Canadian asbestos exporters to India agreed that the risks to Indian workers could be ignored. In 1982, Daniel Perlestein, President of the (Canadian) National Asbestos Society (Société Nationale de 'Amiante) said:

"The question of health does not appear to be a concern in some countries where life expectancy is only 35... most people die by age 35 of other causes than old age or of a cancer that takes 35 or 40 years to grow."⁹

The well-resourced and unfettered public relations campaign mounted in India by asbestos stakeholders has provided fruitful material for several authors in this monograph:



"The question of health does not appear to be a concern in some countries where life expectancy is only 35... most people die by age 35 of other causes than old age or of a cancer that takes 35 or 40 years to grow."

President of the (Canadian) National Asbestos Society

- ◆ Dr. Sanjay Chaturvedi describes a 2003-2004 media blitzkrieg by the asbestos lobby which included special supplements, “news stories,” full page features and advertisements in magazines and national newspapers such as The Indian Express exonerating chrysotile asbestos;
- ◆ Madhumita Dutta presents a detailed analysis of current attempts by industry to sabotage government research into the health effects of exposure to asbestos; she categorizes the continuing use of asbestos in India as a “Crime Against Humanity”;
- ◆ Dr. Richard Lemen deconstructs current global asbestos propaganda initiatives describing them as “smoke and mirrors... illusion and confusion but not fact”; he dissects the epidemiological and scientific flaws in the ongoing attempt in India to “whitewash the effects of chrysotile asbestos,” citing factual errors, inappropriate methodologies, incorrect sampling techniques and unrepresentative cohorts.

Betrayal of Civil Society by the Political-Industrial Establishment

In developed countries, you can't even give asbestos away nowadays; there are laws which prevent society's use of this poisonous substance.¹⁰ To absorb the fall in global demand for chrysotile, asbestos pushers have aggressively targeted consumers in countries with booming economies and lax health and safety regulations. They found a ready market in India as well as ruthless entrepreneurs willing to exploit a substance regardless of the potential harm it poses.

India's asbestos lobby, coordinated by the Asbestos Information Centre (AIC) and the Asbestos Cement Products Manufacturing Association, has plenty of money to throw around; business is, after all, booming as evinced by a steady increase in national chrysotile consumption. Working with stakeholders at home and abroad, asbestos events are planned and initiatives are mounted to convince Indian officials and consumers that chrysotile is indispensable; the fact that safer alternatives are available, as discussed in Nick Clarke's paper: *Potential Health Hazards of Asbestos Cement Roofing for India's Poor*, is consistently denied by vested interests. Links between Indian asbestos trade associations and their international counterparts were uncovered by Canadian emails and briefing documents obtained in 2002 by researcher Ken Rubin under the Canadian Access to Information Act:

“Over the past decade, the (Canadian) Asbestos Institute in cooperation with the Indian Asbestos Information Center (AIC), a member of the Asbestos International Association which represents the interests of the asbestos industry worldwide, has been very active in promoting and ensuring the safe use of chrysotile asbestos in India.”¹¹

The “Rubin dossier” contains details of a meeting between Brigadier Sethi of the AIC and Martin Barratt, Second Secretary (Commercial) of the Canadian High Commission in India in New Delhi on October 8, 2002:

“I met with Brig. Sethi of the Asbestos Information Centre this afternoon. We discussed AIC participation in the workshop on November 11 or a separate get together on Novem-



ber 12. Do you have any further information on whether Mine Jeffrey or LAB (Canadian asbestos mining companies) are participating in this mission? The AIC membership is meeting this Friday (Oct. 11) and Sethi will gauge interest in setting up one on one meetings for the 12th. I also advised him that some of the delegation will be in Hyderabad or Kolkata and he will inform me of interest in those cities as well.”¹²

The Canadian files document steps taken by Canadian chrysotile suppliers to influence India's asbestos debate:

“Since the Indian market is well known by LAB and the client base well established, these dinners are not expected to result in additional business. What is essential at this time is to ensure continued market access for chrysotile asbestos. As you know, the Indian iron and steel industry as (sic) been undermining the continued use of chrysotile asbestos cement products in the wake of the European asbestos ban. The (Canadian) Minister's presence in India gives us the opportunity to reinforce the Indian government's resolve to pursue the controlled-use of chrysotile asbestos.”¹³

Canadian enthusiasm for cultivating a close relationship with allies in India is easily explained:

"After remaining in second place for a number of years, India overtook Japan to become Canada's most important chrysotile asbestos export destination in 2001. These exports were valued at \$30 million and represented 20% of Canada's asbestos shipments."¹⁴

In 2005, Canadian chrysotile asbestos exports to India were worth \$30.3 million and represented 33% of Canada's asbestos exports; Thailand, Canada's second biggest customer, only accounted for 13% of sales. UN trade figures for 2006 show a 90% increase in Canadian chrysotile exports to India, making it India's second largest supplier, after Russia.

Out of Step with the Global Consensus on Asbestos

Contrary to the pro-asbestos Indian Government which has lowered import duty and eased trading restrictions on asbestos in recent years, international agencies such as the World Health Organization and the International Labor Organization are actively working towards the elimination of asbestos use and the imposition of restrictions on global trade.¹⁵ On February 21, 2002 the United Nations Environment Program announced that "all forms of asbestos should be added to an international list of chemicals subject to trade controls."¹⁶ Unfortunately, on multiple occasions delegates from India have vetoed efforts to designate chrysotile asbestos as a hazardous chemical under the Rotterdam Convention.¹⁷ By doing so, they have prevented the implementation of a protocol designed to ensure that importing countries in the developing world are fully informed of the hazards of toxic chemicals, such as asbestos, and pesticides.

During the discussion (2004) on including chrysotile on the Prior Informed Consent (PIC) list of the Rotterdam Convention, Ramesh Inder Singh, the spokesman from India, said:

"We have studied this issue during the past twelve months with an 'open mind' and are not convinced that the opinion of putting chrysotile on the PIC list is correct... More time is needed to dwell on this issue... We oppose inclusion."

In a subsequent discussion (2006), India's representative to the Conference of Parties (COP3) alleged that the science was not "categorical," and that experiments had not been done on the hazards of "pure chrysotile."¹⁸ "We are," he told delegates in Geneva "undertaking several studies on the hazards of pure chrysotile. We strongly support the position of Canada": i.e. India does not support the listing of chrysotile. As all decisions under the Rotterdam Convention must be unanimous, the 2006 veto by India, and 5 other parties to the convention, resulted in a stalemate; even though 95% of the parties supported inclusion, no action could be taken. COP3 opted to defer any decision on chrysotile until October 2008 when COP4 meets in Rome.

Having relied for so long on the supposed absence of information and "inconclusive science" as their excuse for blocking the listing of chrysotile, in the run-up to COP4, In-

dia, Ukraine and Canada undertook "new research" on the health effects of chrysotile. The Indian study is thoroughly discredited in the papers written for this monograph by grass-roots activist Madhumita Dutta and Dr. Richard Lemen, former Assistant Surgeon General of the U.S. The Ukraine study is contained within a skimpy 32 page booklet titled: *It (sic) is possible to use chrysotile asbestos safely?* This flimsy piece of industry propaganda concludes:

- ◆ "(the) cancer risk for chrysotile workers is greatly exaggerated..."
- ◆ "not a single asbestosis case was identified by medical examinations conducted during our study..."
- ◆ "in our study, neither clinical nor epidemiological data ever confirmed occupational cancer cases in asbestos-cement workers in Ukraine..."
- ◆ "The results of our study demonstrated that it is feasible to control asbestos-containing dust levels at the Ukrainian asbestos-cement plants as well as to implement effective prevention measures to reduce the risk of asbestosis and other asbestos-caused diseases including cancer."¹⁹

The study commissioned by Health Canada was born in secret and remains shrouded in mystery. Although designated experts met in Montreal on November 13 & 14, 2007 "to share expertise at the Chrysotile Asbestos Expert Panel: Characterising the Toxicity of Chrysotile Asbestos"²⁰ six months on their findings have not seen the light of day. Responding to a parliamentary question tabled by Canadian MP Pat Martin on April 3, 2008, the Minister of Health would only confirm that "the Panel has completed its work."

Concluding Thoughts

India has one of the wealthiest economies in the developing world; it is predicted to become the third largest economy by 2035. International banking expert Shiv Khazanchi describes the country's expansion as "rocketing," adding that "the number of wealthy resident Indians is the fastest growing in the world." The collective wealth of India's 36 billionaires is estimated at \$191bn. The number of individuals with bankable assets in excess of \$1 million is currently growing by 30% per year and is predicted to reach 300,000 by 2012 (from 120,000 in 2007).²¹ In the words of Journalist Vicky Nanjappa: "India is becoming a country of millionaires."²²

The asbestos spectre hovers over this economic boom as an uninvited wedding guest. While shareholders and asbestos company executives reap the benefits of increasing sales in a market skewed by political favoritism, at-risk workers and consumers of the "poor man's roofing material," gamble their health and that of their families on a daily basis. If, as Nick Clarke says, "India is to develop a stable and growing economy so that all of its citizens might prosper... (it) must respond to the issues generated by the asbestos debate." Failure to do so could have dire consequences for millions of people.

"In 2005, Canadian chrysotile asbestos exports to India were worth \$30.3 million and represented 33% of Canada's asbestos exports."



THE INDIAN GOVERNMENT'S COMPLICITY IN THE ASBESTOS SCANDAL

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On December 10, 2007, the evening bulletin of a national news channel flashed up a bizarre image. A few workers were shown using their bare hands to mix a white powder in with some rice. Then we were shown where the rice ended up – in gunny bags marked “Mohan Basmati Rice, Export Quality.” What we had seen, the channel announced, was evidence of a major food adulteration scam: finely powdered asbestos fiber mixed with talc being used to polish rice, with the aim of making it attractive for consumers willing to pay a premium for “extra white” basmati. The report claimed this was just the tip of the iceberg, indicating rampant use of asbestos in rice polishing mills across the country.

Faced with such a level of criminal activity, one would expect a government crackdown on rice polishing mills. But no action whatsoever was taken! Even more shocking was the revelation that the government had been quite aware of asbestos contamination in polished rice production. A report published by the Agriculture Marketing division (Agmarket) of the Ministry of Agriculture, entitled “Post Harvest Profile of Paddy/Rice,” describes “natural” contamination by asbestos “present in talc, kaolin etc. in polished rice.”

Notwithstanding numerous instances of abuse of a substance that kills and maims millions of people across the world, India has been consistent in maintaining that “controlled use” of asbestos with “appropriate safeguards” is safe; a reality which is far-fetched even in the developed world.

In September 2007, India along with Russia and Canada blocked proposals to control the movement of asbestos wastes being considered by the Open-ended Working Group of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. Due for discussion was approval of the Proposed Workplan on the Sound Management of Asbestos Wastes with Emphasis on Measures to be Taken in Disaster-Prone Areas. The Indian government delegate took the position that more research was needed before declaring chrysotile asbestos to be a hazardous substance.

India had good reason to take such a stand. In 2005, the Ministry of Chemicals and Fertilizers (MCF) along with the chrysotile asbestos product industry commissioned the National Institute of Occupational Health (NIOH) to study the health impacts of chrysotile asbestos on workers. The study was commissioned with an eye on the proposed inclusion of chrysotile asbestos in the Prior Informed Consent (PIC) list of the Rotterdam Convention.

The asbestos industry in India has been trying to stonewall any such inclusion in collaboration with its counterparts in Canada and Russia who are its largest suppliers of raw chrysotile fiber. As per data released by the UN Statistics Division, India imported about 306,000 tonnes of asbestos in

2006, of which 152,820 tonnes was imported from Russia and 63,980 tonnes from Canada.

As part of an elaborate plan to derail the PIC process, the Indian asbestos industry together with the MCF has devised a study entitled “Implementation of the Rotterdam Convention on the Prior Informed Consent Procedures – Study of Health Hazards / Environment Hazards resulting from Use of Chrysotile Variety of Asbestos in the Country.” The total cost of the study is estimated at Rs 5,966,000 (US \$149,150), of which 26% will come from industry. Ostensibly, it may seem India is being prudent by basing its policy decisions on a scientific study; but the following incongruities demonstrate the mala fide intention behind the study (designed to ensure that chrysotile asbestos products would continue to be used):

- ◆ The MCF has been reluctant to share information on the study. An application filed on September 5, 2006, under the Right to Information Act 2005 (RTI Act 2005), requesting information on the study was consistently stonewalled by the Ministry until a summons was issued by the Central Information Commission, the final appellate authority under the Act. Even then, the Ministry reluctantly released partial information and denied access to files, despite the fact that every citizen of India has a constitutional right to inspect public records, including government files. (Only after submission of the first draft of the NIOH report in February 2008, was partial inspection of one of the files allowed.)
- ◆ The study is being conducted under a shroud of secrecy without the knowledge, consultation, or participation of trade unions, occupational health experts or public interest groups. By contrast, the asbestos industry has been consulted right from the conceptual stage of the study and their input is set to continue through to the review process and its finalization.
- ◆ Industry has exerted undue influence on the initial findings of the study. Stipulating anonymity, a scientist from the NIOH confided that representatives of Everest Industries Limited, Kolkata, visited the NIOH after the institute reported to the review committee that a significant number of their workers exhibited impaired lung function (of restrictive type).
- ◆ Representatives of the asbestos industry (some of whom have attended PIC meetings) are part of the review committee of the study.
- ◆ As per the minutes of the review meeting dated December 19, 2006, the “NIOH will analyze and submit its report by March 31, 2008...The report will be finalized after due discussion with the asbestos industry.”
- ◆ The scientific rigor of the study is questionable, judging from a preliminary assessment of the data received under the RTI Act 2005.



- ◆ Repeated pleas to Mr. Ram Vilas Paswan (Union Minister of Chemicals and Fertilizers) to open up the study process and conduct an independent review have been ignored.

In a letter dated May 22, 2007, Mr. Paswan was apprised of the discrepancies in the study and far reaching implications for millions of workers handling asbestos fibers. The Minister, who claims to be a messiah of the downtrodden and the working class, promised to take up the matter with the concerned officials. But in the last seven months nothing has been heard from the Minister or the MCF.

Meanwhile, a band of medical doctors and epidemiologists independently reviewed the design and initial findings of the NIOH study from the data obtained by activists using the RTI Act 2005. All the experts were unanimous in their opinion that the study was a flawed waste of resources and conveyed their views directly to the Chemicals Minister.

In his letter to the Minister dated July 24, 2007, Dr. V. Ramana Dhara, Adjunct Clinical Professor of Morehouse School of Medicine & Rollins School of Public Health of Emory University, Atlanta, USA wrote:

“...the proposed NIOH studies will not achieve the objective of detecting the health effects of asbestos and are thus a waste of valuable resources. It is also my opinion that Indian workers are being needlessly exposed to asbestos and the only prudent solution is to ban its production and use.”

Echoing this opinion, Dr. V. Murlidhar, an occupational medicine specialist and former Associate Professor, Department of Surgery, LTM Medical College, Bombay University wrote to the Minister on July 25, 2007:

“It took 40 years for researchers to follow up a large number of people and a large number of peer-reviewed publications (more than a thousand) to prove smoking causes lung cancer. If one has to prove smoking does not cause lung cancer it will need at least the same number of publications and reviews. The same is the case of diseases caused due to asbestos. The proposed study and the Kolkata study are unlikely to find a place in any peer-reviewed publication.... It is a waste of national wealth. It will be better spent in treating the thousands of asbestosis victims in India.”

Dr. Rakhil Gaitonde, a community medicine expert and Training & Research Associate with Community Health Cell, Chennai, Tamil Nadu, wrote in his letter dated September 6, 2007: “If the Honorable Minister is serious about the health of workers and about accurately documenting the multi-faceted hazards of the asbestos industry (both formal and

informal) on the workers and their families, much better effort needs to go into designing appropriate studies. The Proposal and the Kolkata Study are very poor examples of research in an area that is extremely well developed and of which there are numerous brilliant examples in India.”

While submitting a detailed critique of the study, Dr. Arindam Basu, a Kolkata (West Bengal) based physician-epidemiologist and Associate Director, Fogarty International Training Program in Environmental and Occupational Health, Indian Institute of Chemical Biology, wrote in his letter dated July 31, 2007:

“...I found that both the study plan, the execution of the study at Kolkata and its reporting had serious methodological shortcomings, non-conventional data presentation, and interpretations. I request you to see that before this study can be used as a sufficient documentary evidence for policy framing, it be revised for methods and contents, and possibly re-done. It’s recommended to revise the study plans and re-analyze the original data to start with.

...It’s hard to believe that a nationally important research center of excellence such as NIOH should produce methodologically incomplete and insufficient evidence with misinterpreted data on a serious national issue of asbestos hazard.”

To date, none of the above letters has received an acknowledgment or scientific arguments in defense of the study from the Minister or the MCF.

India’s Entrenched Position

At the 3rd Conference of the Parties to the Rotterdam Convention held in Geneva in 2006, for the third time, India became complicit in an international conspiracy – to prevent the inclusion of chrysotile asbestos on the PIC list. In this, India collaborated with five other convention members; leading the pack opposing inclusion was Canada.

India’s rather embarrassing position is driven by its domestic politics and economic agenda. The chrysotile asbestos-cement industry, with an annual growth rate of 9%, estimated annual sales of Rs 10-11,000 million (US \$227-249 million), and foreign exchange earnings of Rs 1500 million (US \$34 million) in 2006, dominates the Indian asbestos market. More important still, it consumes over 90% of the chrysotile asbestos used (close to 80% in rural low-cost housing, schools, pipes and industrial structures), and thereby exercises considerable influence with respect to government policies on imports, production, and sales of chrysotile-based products. Little wonder then that the asbestos industry has lobbied hard to get the import duty on asbestos lowered from 78% in 1995-96 to 15% in 2004. Indeed, it even managed to get the industry de-licensed in 2003. This means that anyone can now import asbestos freely under the open general license.

The relaxation of import tariffs has spurred the growth of the asbestos industry. The production of asbestos-cement products went up from 0.68 million tonnes in 1993-1994 to 1.38 million tonnes in 2002-2003. Correspondingly, the number of asbestos-based product manufacturing units has been rising steadily. As of 2006 there were 32 units in the large-scale sector, most of them concentrated in the state of Maharashtra.

Economic liberalization apart, the industry also enjoys political patronage. Close ties between the ruling political party and the asbestos industry is evident from the fact that the deputy leader of the Indian National Congress in the Lower House of the Parliament is the owner of one of the largest asbestos-cement product manufacturing companies in the country. In January 2006, permission was granted to this company, in the constituency of the leader of the ruling party in the state of Uttar Pradesh, to set up an asbestos-cement roofing sheet manufacturing plant with an annual installed capacity of 10,000 tonnes of roofing sheets.

In India, asbestos deposits are found in the states of Andhra Pradesh, Rajasthan, Jharkhand, Karnataka, Tamil Nadu and Manipur. Chrysotile and tremolite are mostly mined in the Cuddapah and Udaipur districts of Andhra Pradesh and Rajasthan, respectively. According to official estimates, there are 7 asbestos mines operational in the country employing about 250-300 workers.

The asbestos industry has benefited immensely in the wake of economic liberalization. It seems that almost every law, rule and guideline regulating the import and use of asbestos is in danger of being revoked or bent to suit the industry. Even though the Ministry of Mines claims that it hasn't granted any new mining leases or renewed existing ones since 1995, it is also true that the industry has cajoled the Indian Bureau of Mines, which was commissioned to review the moratorium on new leases, into recommending lifting the de facto ban on asbestos mining.

A written statement in the Lower House of Parliament (Lok Sabha) by Union Minister of State for Mines, Dr. T. Subbarami Reddy, on November 27, 2007 indicates that the moratorium on mining might soon be lifted by the government. The Minister informed Parliament that:

"A study has been conducted by the Indian Bureau of Mines (IBM) regarding the likely effects on the health of the labourers engaged in the mining of asbestos. The Study recommended imposition of safeguards on pollution level in work environment and other remedial measures. Recommendations of the Study have been examined in consultation with all stakeholders. Some stakeholders have suggested that asbestos mining can be permitted with appropriate safeguards. At present the ban on mining of asbestos has not been lifted."

As per official estimates, the asbestos industry employs 8000 workers in the organized sector. Given that most of the workers engaged in the asbestos industry are from the unorganized sector, it is believed that around 100,000 workers are engaged in the industry and are being exposed to asbestos fibers at workplaces on a daily basis.

Although there are no comprehensive quantitative estimates, a number of government and independent studies have shown the prevalence of asbestos-related diseases amongst workers at different points of time. Despite confirmed cases of asbestosis amongst workers and a number of studies conducted over the years suggesting a wider prevalence, so far only 30 workers have been compensated for asbestos-related diseases. And this notwithstanding a slew of legislation for compensation, such as the Workmen's Compensation Act (WC Act) of 1923 and the Em-

ployees State Insurance Act (ESI Act) of 1948.

The apathy of the industry in meeting its responsibilities to its workers runs deeper. A 1995 Supreme Court order to maintain health records for every worker up to a minimum period of 40 years from the beginning of employment in the asbestos industry or 15 years after retirement is hardly being implemented by the industry. Indeed, the workers are denied access to their own medical records, let alone making them available to public interest doctors or groups working on the issue.

Cases of occupational diseases never get reported due to a nexus between the management, medical professionals and government agencies. Industry-sponsored studies carried out by government agencies like the Central Labour Institute, as cited on the asbestos industry's website, show that during 2001-2005 there was not a single case of asbestosis amongst workers in asbestos-cement manufacturing units. However, the wall of silence on the extent of asbestosis amongst asbestos workers was spectacularly breached by an independent study conducted in 2004 by a voluntary group – from the Occupational Health and Safety Centre, Mumbai – at the factory gates of Hindustan Composites Ltd., an asbestos friction product manufacturing plant in Mumbai, showing a 23% incidence of asbestosis amongst workers who participated in the study.

Conclusion

The study presently being conducted by the NIOH with sponsorship from government and industry is nothing but an elaborate sham, designed to hoodwink the international community, the Indian Parliament and the people of India, and to pave the way for the continued use of chrysotile, which will seal the fate of millions of workers in India.

The case of asbestos use in India is a clear example of a "Crime Against Humanity," where the government and the asbestos industry, with full knowledge of the harmful effects of asbestos, are allowing millions of people to be exposed to this deadly substance. The conspiracy between commercial vested interests and bureaucratic apathy is a fatal combination. Unless the state recognizes the gravity of the situation, the scourge of asbestos-related diseases will reach an epidemic proportion.

Late Breaking News In a response to an application submitted under the Right to Information Act, on June 12, 2008, a letter was received from the Tata Memorial Hospital (see Appendix F) which noted that between the years of 1985-2005, 107 cases of mesothelioma had been diagnosed and treated at the hospital. Incredibly, the letter claimed that no work histories had been taken of any of the patients concerned!

Mesothelioma Cases, 1985-2005

Age Group	Male	Female	Total
10-19	2	0	2
20-29	6	2	8
30-39	6	6	12
40-49	18	7	25
50-59	25	5	30
60-69	17	8	25
70-79	5	0	5
Total	79	28	107

SMOKE AND MIRRORS: CHRYSOTILE ASBESTOS IS GOOD FOR YOU – ILLUSION AND CONFUSION BUT NOT FACT RICHARD A. LEMEN, PHD, MSPH



Richard A. Lemen, Assistant Surgeon General, United States Public Health Service (Ret.); email: rlemen421@yahoo.com

The illusionist can make objects appear, disappear, or appear to be what they are not by retracting or extending mirrors, disguising the transitions with bursts of confusing blue smoke. Such illusionary tactics are evident in the materials used by the protagonists for the continued use of chrysotile asbestos, their slick glossy color publications depicting tranquil themes, catchy titles surrounded with green leaves, children playing in fields of trees under soaring white birds, etc. The reader is attracted to these colorful and eye catching publications with illusionary titles such as “Why so much emotion?”¹ or “Chrysotile Asbestos Saves Lives”² or “Asbestos Fibre Types and Health Risks Are Perceptions Related to FACTS?”³ Chrysotile asbestos, as portrayed in these texts, is a positive asset to society and its adverse health effects vanishingly insignificant. In fact, they tell us “you can develop a disease working in any industry if you do not take care of your health” and that is why the workers of the “Uralasbest” facilities in Russia “preserved their health by living a healthy life”⁴ and “illnesses never affect vigorous, active and cheerful people.”⁵ Finally, they ask: “Why have billions been spent attacking a minor health risk?”⁶

What are the facts about chrysotile asbestos? Do the statements of chrysotile apologists comport with the science or are they intrinsically biased?

Asbestos has been a commercially viable commodity since the late nineteenth century because of its many useful properties; principally its insulation properties, its weave ability, tensile strength, and suitability for use in binding composites. The main commercially viable types of asbestos are of two varieties: amphiboles and serpentines. The mineralogical makeup of the two is different in both their chemical and morphological states. The amphiboles contain more iron and tend to be solid straight spear-like fibers while the serpentines contain less iron and appear curly, are hollow, and split longitudinally. Because of these differences, the serpentine form (chrysotile) was the most useful and the most exploited type, making up over 95% of all asbestos used, historically.⁷

Some claim this high usage makes chrysotile chiefly responsible for the asbestos epidemic we are now experiencing.⁸ Others have suggested that chrysotile can be used safely and even say it is not responsible for the diseases we see today.⁹ One group goes as far as to say “Chrysotile Asbestos Saves Lives.”¹⁰ Many of the studies supporting these viewpoints are industry-sponsored – where economic interests collide with health facts. This is not new, as early as 1912, the Canadian Department of Labour denied that the health of Quebec’s millers and miners was affected by exposure to chrysotile and this attitude continues today, even with evidence to the contrary.¹¹

Innovative epidemiology has become a “pseudoscience”

as practiced by some industry paid epidemiologists and differs little from the old “smoke and mirrors” trickery.

Pseudoscience and Brake Mechanics

A good example of this “pseudoscience” is the inappropriate use of “meta-analysis,” a methodology originally used to assess controlled drug trials.* One such analysis sponsored by three automotive companies¹³ concerned the causation of asbestos-related disease among “supposedly” chrysotile asbestos-exposed brake mechanics. In this analysis of mesothelioma, the authors ranked 11 studies into a scoring system. Only four studies fit into the highest ranked tier (I): “studies with the higher (above median) total score were included.” Of these four studies, only one had a score meeting over 50% of the scoring criteria. Yet the authors concluded that: “the available epidemiological data show that employment as a motor vehicle mechanic does not increase the risk of developing mesothelioma.”¹⁴ This type of flawed reasoning, however, is not unique to this study; many industry-sponsored studies draw negative conclusions on less than adequate data. As Sven Hernberg, internationally known epidemiologist and former editor of the Scandinavian Journal of Work, Environment & Health, states: a truly negative study must (i) be large, (ii) be sensitive, and (iii) have well-documented exposure data.¹⁵ The study by Goodman et al. fails to meet two of these issues: (ii) be sensitive and (iii) have well-documented exposure data.

Deception in India

A “Study of Health hazards/Environmental hazards resulting from use of Chrysotile variety of Asbestos in the country,” sponsored by the Ministry of Chemicals and Fertilisers, India, and conducted by the National Institute of Occupational Health of Ahmedabad, India, is a prime example of how to mislead the untrained reader. By design, it lacks sufficient power to determine disease risk. This study which is claimed to be an epidemiological study of all segments of the asbestos industry is a cross-sectional medical study of an active workforce and not a true epidemiological evaluation. The study evaluates the workers by means of a questionnaire to obtain personal characteristics, occupational characteristics, and morbidity details and relies on lung function testing and radiological examinations using the ILO guidelines to determine disease manifestation. The study, described as “multifaceted,” is essentially a segmented study with one or two factories (units) representing each industry segment. Included in one segment study (here and below meaning a study at a particular location) is some assessment of non-occupational exposure.

The first segment study evaluated an asbestos cement sheet-manufacturing unit in eastern India. Although 200 workers are included in the study, only 188 actually participated. The authors do not explain the fate of the 12 missing workers. As part of the study, workplace fiber concentrations

* Meta-analyses of observational studies can present inherent biases such as selection bias and other confounding biases. Meta-analysis is a technique, first envisioned for evaluating clinical studies, where combining results based on homogenous data would be less likely to suffer from biases found in observational cohort analysis. If the data relied upon for meta-analysis have flaws, such as confounders or methodological issues, then the outcome of the meta-analysis will also suffer from the impact of such flaws as will the conclusions reached.

were determined; in these assessments, fibers greater than 5 μm in length and less than 3 μm in width having aspect ratios $\geq 3:1$ were counted, using a Walton-Becket graticule at a magnification of 400 \times . Unfortunately, using this methodology to determine chrysotile content misses many of the chrysotile fibers themselves, thus underestimating the potential work exposures to chrysotile.

The workers examined in the cross-sectional medical study had no reported exposure to asbestos prior to their current employment; thus, the duration of employment represented the maximum time available for development of both progressive and latent asbestos diseases. Since 65% of the workforce had worked in the industry for less than 20 years, the (statistical) power of this study to detect the longer latent asbestos-related diseases such as lung cancer and mesothelioma is quite limited. In addition, by including almost 14% of the workforce with essentially no exposure (stores, laboratory, general pool and other departments) the power of the study is reduced and its ability to detect asbestos-related diseases limited still further. A far greater diminution of the power of the study arises from the choice of only active workers as the study population. Workers not able to work through illness and workers who had quit through ill-health were excluded; this effectively "dilutes" the study population, and thus reduces the significance of any findings connected with disease manifestation. Even with these severe limitations, it is significant that a clear dose-response relationship is evident for both abnormal pulmonary function and restrictive lung disease (the type of lung dysfunction most related to asbestosis): 40% of the long term workers (20+years) had abnormal pulmonary function and 25% had restrictive lung disease. While the authors suggest the restrictive and combined abnormalities were more prevalent in smokers than non-smokers, two issues remain unresolved: firstly, the interaction between smoking and asbestos-related lung disease is not addressed; and secondly, the occurrence of obstructive disease, which is more related to smoking than is restrictive lung disease, remains virtually unchanged as duration of work increases. This would indicate smoking may have played a very small role in the abnormalities observed and that exposure to asbestos was the more likely causative factor. The authors indicate that 107 workers had normal radiographs, 77 had normal features except for prominent bronchovascular markings (which are not explained), and four had radiographs suggestive of interstitial lung fibrosis, which was ruled out after High Resolution Computer Tomography (HRCT) of the thorax. Overall, this study, by design, is very limited in its ability to detect asbestos-related diseases of a non-malignant nature and essentially unable to evaluate the risk of longer-term asbestos-related malignant diseases such as lung cancers, mesotheliomas or gastro-intestinal cancers. In addition, worker exposures would be underestimated.

The second segment study evaluated an asbestos cement sheet-manufacturing unit of western India. This assessment used essentially the same study design as above; however, in this unit, the study population comprised only 60 active workers.

Work durations were much shorter here than in the eastern

unit with 62% of the workforce having worked at the factory for 5 years or less, 35% for 6-10 years and only 3% for over 10 years. Since, as for workers in the first segment study, the duration of employment coincides with latency (time since onset of exposure), it would be even less likely here, than for that study, that non-malignant asbestos-related disease would be detected and be virtually impossible to detect any long-term malignant diseases. Since this study used the same type of environmental sampling as the first segment study, it also underestimates the true exposures to chrysotile asbestos. In summary, this second segment study is, by design and composition of the workforce, much less likely to detect any relevant asbestos-related diseases than the first segment study.

The third segment study, "Study of asbestos jointing material-manufacturing unit," examined, in the same fashion as the first two studies, 70 active workers. This study appears also to include workers not exposed in the manufacturing process (15% were described as cleaners; however, it is unclear whether persons employed for cleaning were actually exposed or not). Only about 1/3 of the active workforce had potential exposures dating back more than 10 years, thus severely limiting the possibility of detecting long-term asbestos-related diseases. Using the same sampling techniques as the first two segment studies the likelihood of underestimating the true exposures to chrysotile is great.

The fourth segment study was entitled: "A comparative study of asbestos workers, end-users and community in the vicinity of asbestos factory." Such comparisons are usually of very limited value as they can include members of the workforce under study within the comparison populations, thus resulting in double counting and making any differences between the exposed group of asbestos workers and the community or end-users less distinct. It is also possible that plant emissions drift to the community near the plant and those end-users can also experience exposure from this source in addition to that from asbestos-containing products. In summary, this segment study, by design, is unlikely to detect real differences between the asbestos workers and the two comparison groups.

The next segment study was entitled: "Study of asbestos brake-lining manufacturing unit." The active workforce consisted of 153 workers of which 32.7% had less than 10 years, 65.4% had 11-20 years and 1.9% had greater than 20 years work experience or latency. This study appears to have included 8.5% of the workforce not exposed to asbestos in the production process. Here again, the prevalence of low latencies in this active worker population would make any detection of asbestos-related disease unlikely and the environmental monitoring would likely underestimate exposures to chrysotile asbestos for the reasons given in the analysis of the first segment study.

The last segment study, "Study of asbestos pipe manufacturing unit," assessed 95 active workers. This population appears to include 24% of workers with little or no exposure to the production processes and 96% of the workers had less than 10 years work experience or latency. This study would have extremely limited ability to detect asbestos-related disease because of the short latencies in the active workforce. Once again, airborne asbestos levels would

be underestimated due to the limitations of the sampling methods.

Overall, a reading of this study by the untrained reader would seem to support the safety of using chrysotile asbestos. However, the methods used in the "Study of Health hazards/Environmental hazards resulting from use of the Chrysotile variety of Asbestos in the country," preclude the validity of any such conclusion. In fact, very little light is shed on the safety or otherwise of chrysotile use by this cross-sectional study because it focuses on active workforces. By their very nature such groups of workers are characterized by low latencies – particularly low in some of the workforces studied – so discovery of long-latent asbestos-related diseases is virtually impossible. In light of this fatal flaw and underestimation of exposures due to poor sampling methodology the study is revealed to be pure deception, an illusionist's trick aimed at obscuring the health effects of chrysotile.

Pure Chrysotile or the Old Shell Game

The majority of studies of asbestos exposures relate to mixed fiber types. As expressed by de Klerk and Musk: "arguments that chrysotile in its pure form does not cause mesothelioma and therefore can be safely used for certain products for which other substitutes perform worse are more theoretical than practical: firstly because it is almost never found in its pure form but is contaminated by tremolite (or even 'Balangeroite') and secondly because of its association with lung cancer."¹⁶ Very few studies have considered pure chrysotile fiber exposures, because of the inherent contamination with amphibole asbestos.

However, when researchers report mesothelioma in those relatively few cohorts exposed to pure chrysotile, their findings are readily dismissed by proponents of chrysotile use, who miraculously "discover" contamination of the chrysotile, not identified by the study authors which, it is claimed, accounts for induction of the disease. This technique resembles the three shell game, where tricksters extract money from gullible players by inviting them to guess the location of an object placed beneath one of the shells. After shuffling the shells the trickster has no difficulty in fooling most players into choosing an empty shell. In the chrysotile apologist's version of the game all three "shells" conceal case studies and/or statements supporting chrysotile use: "chrysotile is safe to use"; "pure chrysotile does not cause mesothelioma"; "if mesothelioma has been found from exposure to pure chrysotile then 'obviously' the chrysotile was *not* pure." Depending upon the circumstances, those questioning the safety of chrysotile are persuaded to turn over the appropriate shell, since if all three strands of argument were revealed together the contradictions would be evident. This chicanery is designed to disguise the fact that it is the authenticity of studies supporting chrysotile safety that should be scrutinized not the alleged purity of exposure. If certain mixed exposure studies favored by chrysotile apologists are not finding mesotheliomas whereas studies on pure chrysotile are, then the methodologies of the group with negative findings should be regarded as suspect. However, it is expediency rather than truth that drives the continuing multi-national campaign to promote the sale of chrysotile asbestos, and which claims it is safe

to use, even with its near universal contamination with amphiboles. The Chrysotile Institute asks "Why so much emotion" and proceeds to tell us that "Today, if one says that asbestos kills, this person is only confirming his great ignorance of recent scientific studies... or has other motivations to say so."¹⁷

Some reports claim that amphiboles are as much as 100 to 500 times more potent in inducing mesothelioma compared to chrysotile, but with the difference less clear for lung cancer.¹⁸ On the other hand, much lower potency ratios have been reported: 2 to 4-fold in one study and 14 to 26-fold in another.¹⁹ It is pertinent to note that none of the reviewed risk analyses concluded that chrysotile does not cause mesothelioma and most did not consider relative risks between the fiber types for induction of asbestosis and other cancers.

The real difference between the fiber types with regard to mesothelioma induction is hard to gauge because few, if any, of the cohorts analyzed were exposed to pure chrysotile or had sufficient latency to manifest this long latent disease; however, considering cohorts exposed to mainly chrysotile there does appear a difference between the amphiboles and chrysotile for the induction of mesothelioma.²⁰ Proponents of the "amphibole theory" rely heavily on the lower biopersistence of chrysotile compared to amphiboles, as evidenced by their choice of lung burden analysis to determine received asbestos dose and disease causation. When, chrysotile-exposed individuals are examined in this way some time after exposure and their lungs are found to be clear of observable chrysotile fibers the pro-chrysotile view is that they are at no more risk than the background population. Such reasoning misses the fact that the predominant fiber found in the pleural area, where the majority of mesotheliomas occur, is chrysotile.* To use lung burden as a parameter for determining causation of mesothelioma is unscientific. Why should a higher prevalence of chrysotile, approximately 30% greater than amphiboles, being the fiber type proximate to the tumor site be ignored as having a significant role in mesothelioma causation? In addition, results from analyses of cohorts having relatively low mortality due to the young age and short latency of the study population will lead to inappropriate calculations of risk. Selikoff et al. (1973) have shown that the proportion of a cohort dying from mesothelioma can actually change as the cohort ages, with a corresponding change of risk from low to high. In their analysis, they found the proportion of the cohort dying from mesothelioma increased 16-fold as total mortality advanced from 12% to 68%.²⁵

Scientific evidence on cohorts where fiber counts have been quantified by using both phase contrast microscopy (PCM) and transmission electron microscopy (TEM) show that both asbestosis and lung cancer occur with frequencies independent of fiber type and that non-regulatory fibers, those less than 5 μm in length, also have a causative role.²⁶ These findings point again to the flawed logic of using the PCM methodology for cohort exposures or relying on lung burden analysis alone to determine body burden of asbestos exposures. In fact, PCM technology as well as SEM technology will miss chrysotile fibers in the lung because of inadequate resolution.†

* Mesotheliomas develop in the pleura, peritoneum and other mesothelial cells that form a monolayer mesothelium lining the serosal cavities and the organs contained within these cavities.²¹ Chrysotile is a cause of cancer in the lung and migrates to the mesothelial linings of the body.²² Since chrysotile is carcinogenic and is present in high concentrations in the mesothelial linings where the mesothelioma is induced, it is biologically plausible that it causes or contributes to cause mesothelioma. Fiber penetration can rearrange the cytoskeletal apparatus of the cell and this could indicate an interaction between the chrysotile fibers and the normal mitotic process, since giant multinucleated cells are formed. These studies indicate that chrysotile penetrates the cell, enters the nucleus and induces abnormal chromosome formations in dividing cells.²³ Some of these abnormalities include the deletion of the P53 gene.²⁴

† While PCM has been the international regulatory method for analysis, it is not able to detect thin diameter fibers [$<0.2\mu\text{m}$ in diameter].

Threshold, No Threshold or What is This I See Before Me

Multiple governmental scientific agencies concur that there is no exposure threshold for asbestos, including chrysotile;²⁷ however, proponents for the continued use of chrysotile and those facing litigation stubbornly insist the authorities are wrong about chrysotile. In the most recent attempt to show this, an analysis by Pierce et al. (2008)²⁸ “funded almost entirely by Chrysler Corporation, Ford Motor Company, and General Motors Corporation” selected four papers with mixed exposures* to address the question: does chrysotile have a NOAEL (no observable adverse exposure level) for mesothelioma.† By using studies with mixed exposures, the most this analysis can show is that low exposures result in low rates of disease; something already established in the epidemiology literature.

The authors state that they reviewed 350 studies and selected cohort studies with the most power – longer follow-up, larger study population – for analysis. In estimating some exposures the authors rely upon a contract report submitted, but not endorsed by the EPA, for “best estimates of the fraction of amphiboles present.”²⁹ This contract study made presumptions based on unsubstantiated scientific data. For example, assuming short fibers were inactive and thus considering only longer fibers; and presuming chrysotile less potent based on studies of cohorts possessing inadequate latency for the full extent of disease manifestation to be observable. This latter point was exactly what Selikoff and colleagues warned about earlier when discussing how mesothelioma risk estimates increase as study cohorts age.³⁰

Pierce et al. could find only four studies out of the 350 they reviewed suitable for determining the NOAEL for mesothelioma from chrysotile. The studies selected were Lacquet et al., 1980; McDonald et al., 1984; Albin et al., 1990, and Piolatto et al., 1990.³¹ These studies include 15 mesothelioma deaths.

The first study, by Lacquet et al., featured workers from Eternit NV (Belgium), a company that processed about 35,000 tonnes of chrysotile annually along with 3000 tonnes of crocidolite and 1000 tonnes of amosite. The mortality study group consisted of workers who had been employed at the factory for 12 months or more within a 15-year period (1963-1977). No latency analysis is given for the cohort members nor the one mesothelioma victim detected in the mortality study. The cohort did have a high incidence of asbestosis with 29 cases, of which seven died from the disease. Deaths from gastrointestinal cancer, a cause of death found in excess in multiple asbestos cohorts, were also in excess in this cohort, but the authors decided this excess was not asbestos-related due to lack of any relationship to fiber-years; the authors ignored the relationship to latency which they did not disclose. Due to the absence of any discussion of latency by the study authors and Pierce et al., no indication of a possible NOAEL for mesothelioma can be drawn from this study; as has been pointed out earlier, latency is a key factor affecting the (statistical) power of any risk assessment for mesothelioma. The study authors passed the occurrence of one mesothelioma as “almost certainly related to heavy exposure” with no other information given.

The study by McDonald et al., 1984, supported by a grant

from the Quebec Asbestos Mining Association is also problematic if it is supposed to provide evidence for a NOAEL. Sixty-four percent of the cohort was still alive and the authors observed no mesotheliomas at the time of the study publication, an observation not unexpected given the earlier analysis by Selikoff on cohort aging.³² Pierce et al., have slanted their mirrors to deceive the reader by selecting this study, which does not allow sufficient manifestation of latency to evaluate the extent of mesothelioma impact on the population studied.

The Albin et al, 1990 study found 12 mesotheliomas where chrysotile was the main type of asbestos used in conjunction with smaller amounts of both amosite and crocidolite. Pierce et al., have again slanted their mirrors and been exceptionally heavy with the blue smoke. They ruled that none of the observed 12 mesotheliomas was suitable for associating with a NOAEL because the information to do so was “not available,” whatever that meant. However, they go ahead and obtain a relative risk (RR) of 1.9 (0.25-55.7) which is insignificant and conclude that 15 fiber/cc-years (f/cc-yrs) with a mean of 3.1 f/cc-yrs and a median of 1.4 f/cc-yrs is the NOAEL.

The last study selected is by Piolatto et al, 1990 and is of a chrysotile mine in Balangero, northern Italy where contamination of 0.2 – 0.5% balangeroite occurs. The authors found two mesotheliomas of which Pierce et al. used one to associate with a NOAEL of greater than 400 f/cc-yrs, the highest NOAEL of the study. It should be noted that only 40% of the studied cohort were dead at the time of publication leaving 60% alive. Thus, the significance of the two mesotheliomas, which Piolatto et al. associated with a moderate excess of mesothelioma, is lost to the reader of the Pierce et al paper, because with 60% of the population under study still alive only those with the highest exposures or longest latency would be expected to have developed mesothelioma by the time of the study. Relying on the smoke and mirrors, Pierce et al. hope that the reader will be of the impression that this same trend will hold true after the next 60% of the cohort die, which the astute reader will recognize as pure speculation.

In attempting to arrive at NOAEL for chrysotile induced mesothelioma, Pierce et al. have used data from studies with multiple deficiencies: inadequate cohort aging and latency, and questionable exposures both with regard to fiber types and levels. Where, the data do not meet the desired pattern the slanted mirrors come into play with the smoke of statistical manipulations hopefully confusing the reader into thinking the authors’ arguments have some substance.



**This is because chrysotile only exposures do not generally occur, thus epidemiology studies of “so called” pure chrysotile cohorts are usually found to have questionable exposure to amphibole contamination.*

†Their selection criteria were:

- 1. Outcomes of interest including lung cancer (variously identified as “lung cancer,” “respiratory cancer,” “malignant respiratory neoplasms” or “malignant neoplasms of the lung”) and/or mesothelioma.*
- 2. The cohort was predominantly exposed to chrysotile asbestos (less than 10% of the potential asbestos exposures involved amphiboles).*
- 3. There were no other known occupational exposures to respiratory carcinogens.*
- 4. Relative risk or relative mortality estimates were provided or could be calculated and stratified by cumulative chrysotile exposure.*
- 5. Cumulative chrysotile exposures were stratified into two or more exposure levels by the authors.*

Illusion, Dissolution, and Confusion – the Weapons of those that Claim Chrysotile is Safe

Asbestos industry propagandists³³ rely on older reports by international health agencies to support their arguments; they fail to report that these agencies have changed their positions as newer science developed, the very charge they level at scientists who support a ban for all forms of asbestos. For example, the Chrysotile Institute uses a 1989 World Health Organization report to support a different standard for chrysotile while a later 1998 joint report of the World Health Organization, the International Labour Organization, and the United Nations Environmental Programme states “No threshold has been identified for carcinogenic risks.” The most recent statement of the WHO in 2006 is categorical: “. . . there is no evidence for a threshold for the carcinogenic effect of asbestos. . .” and “. . . the most efficient way to eliminate asbestos-related diseases is to stop the use of all types of asbestos; . . .”³⁴

While there is a consensus in independently-authored scientific papers that all forms of asbestos cause asbestosis, lung cancer and mesothelioma, the chrysotile lobby continues to disseminate misleading “information” to bolster its assertion that “low risk” chrysotile can be used safely under “controlled conditions” and should not be banned.³⁵ Supporting this position, pro-chrysotile proponents cite data out of context and without references, something avoided in this paper, which provides the reader with citations for supporting statements. The Chrysotile Institute claims that an international consensus panel and many new studies confirm that chrysotile fiber is definitely less dangerous than other types of asbestos. It described the conclusions of the consensus panel as follows: “A group of scientists mandated by the Environmental Protection Agency (EPA)

unanimously agreed that available studies on epidemiology indicate that the carcinogenic potential of amphibole fibres was one hundred times (100x) higher than that for chrysotile fibres.” This statement is not true.

First, the EPA did not mandate this group of scientists; this was a contract report where the contractor independently selected the scientists, not the EPA. Sec-

ond, this was not a consensus report as one can see when reading the independent scientists’ comments within the body of the report. Third, this was a report to the EPA that has never been sanctioned by the EPA, nor adopted as official policy; nor has the EPA changed any asbestos policies because of this contract report.³⁶ As we have seen, this is the same report relied upon to substantiate assumptions made by Pierce et al. in their “no-effect chrysotile paper.”

The source of “new scientific data” invoked by the Chrysotile Institute remains a mystery; the “important new study” which it says clearly confirms “the difference, from the epidemiological point of view, between chrysotile and amphiboles” is never identified. Most recently and after publication of the Chrysotile Institute report, a new epidemiological paper, by the U.S. National Institute for Occupational Safety and Health (NIOSH), has shown no difference in potency between chrysotile and amphiboles for inducing asbestosis or lung cancers.³⁷

Using current developments to its own ends, the Chrysotile Institute is claiming a major shift in the NIOSH position on the safety of asbestos, citing a statement by the NIOSH Director in Congressional testimony that “the current legislation was the most appropriate to protect workers.” The Chrysotile Institute does not realize that legislation is different from regulation and that NIOSH still has the same recommendation as first articulated in 1976, that a ban on asbestos is the only way to eliminate asbestos-related diseases.³⁸ Furthermore, this position is in fact supported by current legislation: the Occupational Safety and Health Act, 1970.

The chrysotile lobby relies on misinterpretations, false claims and undocumented statements to advance its global propaganda campaign for the continued use of chrysotile asbestos. While its smoke and mirrors strategy or its shell game may be suitable for illusionists and entertainers, the obfuscation of scientific truth resulting from such practices can have grave consequences when evaluating the risk of disease and death for those exposed to the hazards of asbestos. In a profit-driven frenzy, the asbestos alchemists peddle their toxic wares to ill-informed governments and consumers. But blow away their smoke, remove their mirrors, turn over all three shells and the truth emerges for all to see: asbestos is deadly, there is no safe concentration of exposure identified, industry propaganda is unreliable and the continued use of chrysotile is unconscionable.



ABUSE OF THE MASS MEDIA BY THE INDIAN ASBESTOS INDUSTRY

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Historically, the burden of industrial pollution has reached the developing world much faster than the fruits of industrial growth. This visible sign of the global power structure is there for all to see, but certain crippling local factors contribute to accentuate this phenomenon. Weak politics, weak science and weak legislation – further impaired by half-hearted enforcement – is no match for a strong and defiant corporate sector, augmented by opportunistic use of the mass media. The story of asbestos follows this pattern. Projections suggest that the asbestos-related cancer epidemic may take more than 10 million lives before exposure to asbestos is brought to an end by banning asbestos globally.¹

Information suggesting an asbestos–cancer relationship was available as early as the 1940s. By the 1960s, enough epidemiological as well as experimental evidence existed to prove the relationship. For half a century the asbestos industry, in collaboration with some of the leaders of occupational and respiratory medicine, was able to suppress most of this data.² Meanwhile, millions of people were exposed to the carcinogen and hundreds of thousands died. For decades, asbestos manufacturers promoted widespread distribution and use of a known carcinogen, just to keep their profits intact. Now we have a job on our hands to combat this assault. The knowledge that asbestos causes cancer became public in the 1980s, not from revelations by the scientific community but as a result of a prolonged struggle, involving public activism and legal actions on behalf of asbestos victims, largely in countries where civic institutions were well-developed.

Since new asbestos use is being made increasingly difficult in the developed world, “global asbestos Inc.” is trying to create new markets in countries with weak legislation. Over 42 countries have banned all forms of asbestos, including chrysotile. Others have planned a 3-5 year phase-out of asbestos use. In the European Union (EU), although

some member States had their own bans in place, the deadline for prohibiting the use of chrysotile for all EU States was January 1, 2005 – other forms of asbestos having been banned previously. In contrast, Indian asbestos companies continue to flourish in a pro-asbestos climate. Rapid growth potentials are being used as a ploy to stall movement toward an asbestos ban. Market stakeholders have strong incentives.

They have influenced policy to effect a constant reduction in asbestos custom duties. Rising revenue and increasing manufacturing capacity of all major asbestos players make asbestos a “good investment” in the share market, according to financial analysts and advisors.³ New production units for asbestos-cement products are being established every 2-3 years. The vast majority of this hazardous product (80%) is used for rural low cost housing, schools and industrial structures. Recently, efforts were made to use asbestos products in tsunami rehabilitation projects, even when safer, non-flammable substitutes existed.

Seeking to dominate the Indian asbestos agenda, there has been an aggressive industry-sponsored misinformation campaign in the public domain. In 2003-2004, we saw a media blitzkrieg of pro-asbestos propaganda. Initially it started with full page advertisements^{4,5} in most of the national dailies and magazines, appearing on a regular basis. Then came a spate of special supplements, full page features and news stories. They were apparently authored by the asbestos-cement manufacturers but the credit line was either anonymous or belonged to the newspaper, providing much needed reach and credibility to the industry.⁶⁻⁸ Most of them misreported scientific papers and proceedings. The case of one such feature that appeared in The Indian Express is typical.

Special Feature in The Indian Express⁶

On July 15, 2003, a leading and highly respected Indian national daily – The Indian Express – published a full page feature entitled *Blast those myths about asbestos cement* in its main edition. It was described as a special feature. There was no credit line, and nowhere was it written that the feature was contributed by asbestos manufacturers. The feature, illustrated by colored photographs, had 2 five column articles, 1 triple column article, and 2 box items – full of misleading and quasi-scientific information.

Let us examine some key assertions made in the feature: that “mesothelioma is not reported when only chrysotile is used”; that this “conforms to western studies where no increased risk of lung cancer is found in asbestos cement factories where only chrysotile fibre is used”; that “asbestos sheets are of a non-toxic nature.” These statements are simply untrue. WHO Environmental Health Criteria-203 says that exposure to chrysotile poses increased risk for asbestosis, lung cancer and mesothelioma, and where safer substitutes for chrysotile are available, they should be considered for use.⁹ The International Agency for Research on Cancer states that all forms of asbestos are known carcinogens, and all have been shown in epidemiological, clinical and laboratory studies to be fully capable of causing lung cancer, mesothelioma and a whole range of asbestos-related diseases.¹⁰ Leading scientific journals have opined that chrysotile, like all other forms of asbestos, is a potent human



"For decades, asbestos manufacturers promoted widespread distribution and use of a known carcinogen, just to keep their profits intact."

carcinogen, and that the amount of chrysotile asbestos already released into the environment creates a situation where exposure to chrysotile products remains the leading cause of mesothelioma in the world.^{11, 12} To rationalize its stand on asbestos, the Express feature goes further and asserts: "...disease would occur with a prolonged exposure of 5 to 20 fibers per cc over a period of 40 years. The current Indian exposure is less than 1 fiber per cc." What WHO Environmental Health Criteria-203 says on the issue is that no threshold has been identified for carcinogenic risk.⁹

The author of this article made all of these facts available to the Editor of the Express, pointing out that:

- ◆ the readers of the Indian Express had a right to be informed of these facts as well;
- ◆ since it was not made clear that the feature was contributed by industry, readers would take it to be an Express authored feature and that, unless counter-arguments were published, the newspaper would be serving the purposes of industry by providing them with a platform, using the credibility and reach of The Indian Express;
- ◆ such one-sided coverage could hardly be justified as part of the "chrysotile debate."

The newspaper failed to respond to repeated communications and rejoinders from this author (Jul 18, Jul 24, Aug 5, and Nov 17, 2003).¹³ Nor did it publish the scientific facts countering its feature.

Expressing her disappointment on publication of this feature, Laurie Kazan-Allen of the International Ban Asbestos Secretariat wrote to the Express on August 4, 2003:

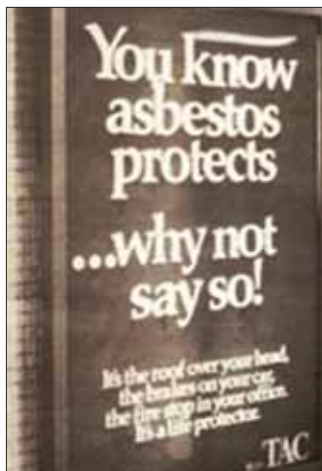
"...For over one hundred years, asbestos has been used commercially in a wide range of products. From 1896, concerned individuals began to report a high incidence of disease amongst asbestos workers in England, France and elsewhere. With time, Western countries realized that asbestos was a lethal substance and banned its use. Unfortunately, global asbestos producers decided to continue their trade in this class 1 carcinogen and targeted users in developing counties. It is appalling to realize that a substance which is mined in Canada and is deemed too hazardous to be used at home is exported

to India. The Canadian asbestos industry continues to profit while workers and the public in India continue to die from asbestos-related disease. There is no excuse for the continued use of this material.

In September, 2003, Canadian and international experts will be attending a conference in Ottawa, Canada entitled: Canadian Asbestos: A Global Concern. This meeting aims to expose the double standards of the Canadian asbestos industry in continuing this deplorable trade. I suggest that if your journalists truly wish to appreciate the extent of the damage done by asbestos, they cover this conference. We will have speakers from India at the conference who will inform the delegates of the deplorable asbestos legacy which your country has suffered and continues to suffer as the use of asbestos continues..."¹⁴

This letter too failed to generate any response from the newspaper. However, after a good five months, on December 11, 2003, the newspaper published a small double column piece in its middle pages, providing some scientific facts on chrysotile and condemning asbestos-industry propaganda.¹⁵ This may have been purely coincidental since the piece made no reference to the July 15 feature. The damage was already done.

The unabashed abuse of power and wealth by the Indian asbestos industry continues under the garb of freedom of expression. Web-based electronic newspapers are following such stories.¹⁶ Counterpoints and protests are either ignored or appear in small inconspicuous letters. We can't expect a dramatic change in the character of the mass media; it is not simply a case of funding. In fact, the corporate sector owns most of the channels of mass communication by proxy. Financiers have acquired direct control over editorial policies and space for independent opinion has been pushed to the margins. In this climate, there are no level playing fields and the asbestos industry is likely to enjoy extensive clandestine support from hidden persuaders. Such a big-business-media nexus can only be neutralized by public awareness and the concerted perseverance of scientific associations. A misinformation campaign promoting asbestos is being conducted in public, without any visible opposition. What is being marketed as debate is largely doctored by the industry. The only way out seems to lie with an organized intervention by academics and health professionals in partnership with concerned individuals. It would be fatalistic to say that academics don't stand a chance against the media onslaught. Even a single vote matters and can set in motion huge changes.



HEALTH HAZARDS DUE TO ASBESTOS EXPOSURE IN INDIA

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Asbestos is well known for its deadly effects such as lung fibrosis, malignant mesothelioma and bronchogenic carcinoma. Consequently, the use of all forms of asbestos has been banned in most developed countries. Unfortunately, not only has India failed to impose such a ban, it has greatly increased asbestos use in recent years, with asbestos imports surging by around 47% between 2004 (172,397 tonnes) and 2006 (253,382 tonnes), according to USGS supplied data. Meanwhile, domestic production of asbestos, resulting from largely illegal mining, has been maintained at an estimated 18-20,000 tonnes per annum.

India is reported to have 33 large-scale units, manufacturing mainly asbestos-cement sheeting, and 673* small-scale units producing other asbestos products or grinding asbestos ore. It has been estimated that 100,000 people are occupationally exposed to asbestos in the Indian asbestos industry,¹ with many more, possibly millions, receiving some level of exposure in the construction sector.

As with other industries in India the asbestos industry is divided into "organized" and "unorganized" sectors. Strictly speaking, according to the Factory Act, such divisions for manufacturing businesses are based primarily on size, with concerns employing more than nine people (or 19 for non-powered operations) accorded "organized" status. However, these terms are also applied to workers, with those not covered by labor agreements and with no occupational entitlements, such as sick pay, pensions, etc., being described as "unorganized."[†] While the core of organized-sector workforces comprise relatively well paid "organized" workers, many industries, including the asbestos industry, are heavily reliant on "unorganized" contract laborers who enjoy little protection under the law.

The organized sector consumes large quantities of mainly imported asbestos; however, the manufacture and processing of many asbestos products takes place in unorganized-sector enterprises. The operation of such units is frequently accompanied by high asbestos fiber releases, both into the workplace and the external environment, exposing workers and local populations to serious health hazards.^{2,3} This is not to say that workers in organized-sector plants are safe: the national permitted exposure limit (PEL) has been set higher than the internationally recognized standard and it is alleged that many enterprises exceed this limit. Even in well-regulated establishments, with exposures well below the permitted value, asbestos-related malignancies may result from prolonged low-level exposure. In addition, products from these plants pose a danger to end-users and tradesmen handling them.

Sources of particularly high exposure are asbestos mines and the small-scale units that process the mined asbestos. Although there has been a moratorium on granting new leases for mining, the fact that illegal mining contin-

ues unabated means that many of these units still exist, particularly in Rajasthan, where 95% of India's asbestos production has occurred. Nearly half of all small-scale asbestos processing units are in Rajasthan; even if they were all closed down now, there would still exist a legacy of asbestos disease due to past exposure. Traditionally, underground mining was carried out by male workers while for opencast mining both men and women were employed. Many women work in small milling and processing units where fiber concentrations are very high. Milling involves the use of small crushing machines with little exhaust ventilation provided.

In order to bring to light the health status of current and former asbestos industry workers the Central Pollution Control Board sponsored a project under my leadership entitled "Human Risk Assessment Studies in Asbestos Industries in India." The project was an in-depth study involving determination of asbestos fiber type and airborne concentration outside and inside the surveyed units, occupational exposure, and the health impacts of asbestos exposure on workers and populations adjacent to the units. The presence and effectiveness of control measures within the units were also reported. In what follows, the results of this investigation are outlined and the implications of India's continued use of asbestos are addressed.

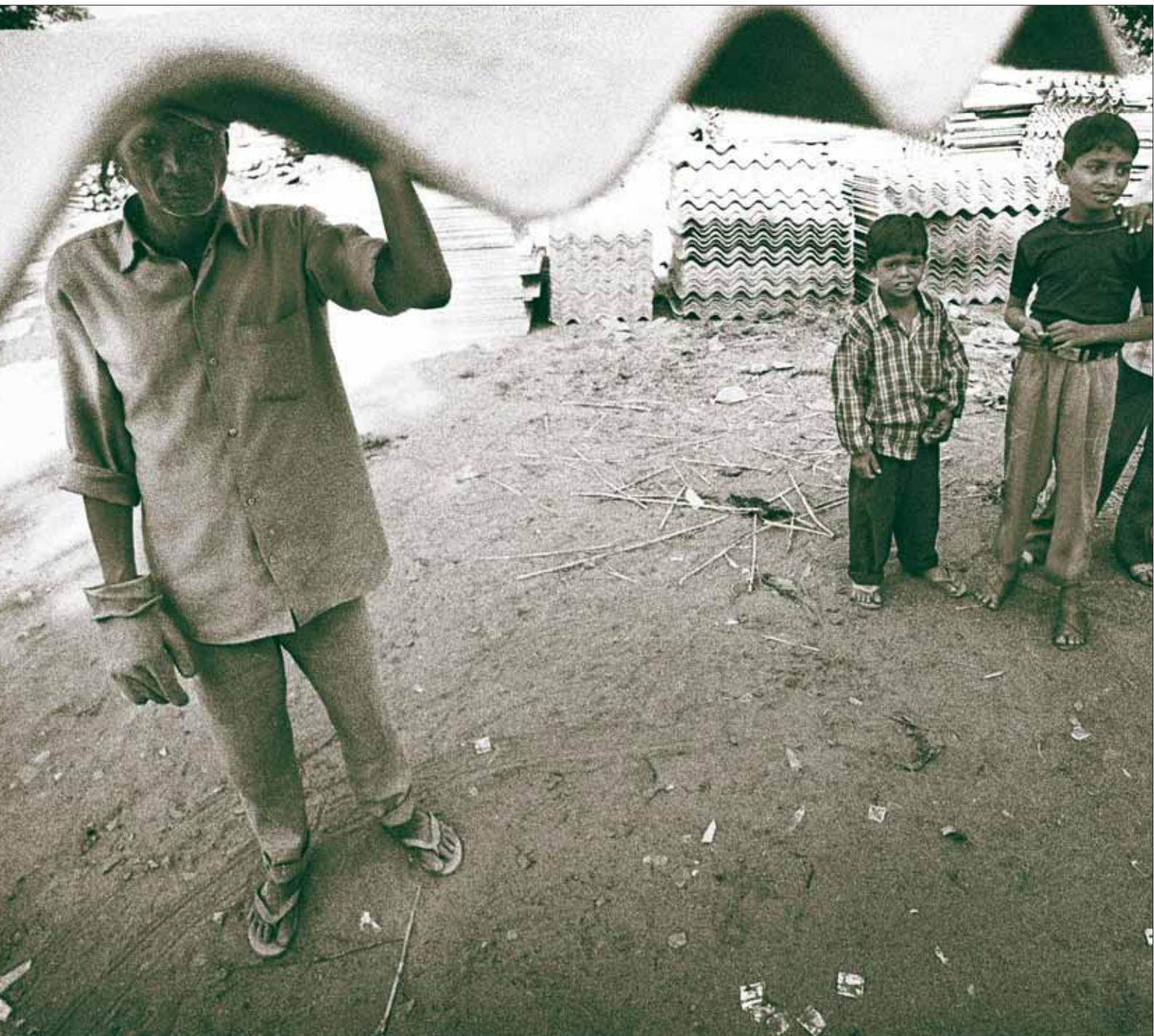
The project focused on 18 small-scale units in Rajasthan and 8 large-scale units in Maharashtra, the state with the highest concentration of large-scale asbestos units. Among the small-scale units, nine were involved in grinding or milling asbestos, two in both milling and manufacturing and seven units in manufacturing asbestos-based products, including asbestos-cement pipes, jointing, fittings, electric heater plates, and water tanks, etc. The large-scale units produced clutch plates, brake shoes, asbestos-cement sheets, water tanks, rope, and other asbestos-based products.

For each unit studied, the type of asbestos used was identified, airborne fiber concentration and size distribution measured, and health impacts of exposure assessed. To determine personal exposure air sampling was conducted within the "breathing zone" of the worker concerned.

With regard to health effects, the primary concern of the survey was to determine the incidence of asbestosis, in both workers and populations adjacent to asbestos units. Typically, asbestosis results from heavy exposure to airborne asbestos fibers over a prolonged period; symptoms – the first of which is generally exertional dyspnoea (breathlessness) – do not usually appear until 20 years after the commencement of exposure. To diagnose this disease in the individuals studied, radiological examinations and pulmonary function tests, in conjunction with histories of asbestos exposure, were used. In addition, tests for the presence of asbestos bodies and serum markers for chromosomal damage were conducted.

**This figure for the number of small-scale units dates from 2000; more recent estimates could not be found.*

† The term "informal" is used analogously.



The small-scale units surveyed in Rajasthan processed indigenous asbestos available from nearby mines. Analysis of the asbestos used by means of XEDS (x-ray energy-dispersive spectrometry) and phase contrast microscopy showed it to be tremolite. The airborne fiber concentration was 18-22 f/cc in the workplace area, much higher than the prescribed national permissible exposure limit of 0.5 f/ml (Central Pollution Control Board, New Delhi, 2005), which itself is much higher than the internationally accepted Occupational Safety and Health Administration (OSHA) limit of 0.1 f/ml.

In these small-scale units, asbestos is processed using obsolete technologies and workers did not wear masks or gloves. Housekeeping was found to be very poor in these units; during the survey it was noticed that children and pets were playing on the asbestos heaps and a number of workers were smoking. There were no effective control measures in evidence.

In the large-scale plants the type of asbestos used was almost exclusively chrysotile. While airborne fiber concentrations were found to be lower in these organized-sector units (1.71 f/ml), possibly due to wet processing, housekeeping was also unsatisfactory. It was noted that workers did not change their clothes after a shift; fibers on their clothing were carried into their homes, contaminating that environment also.

The incidence of asbestosis in the unorganized-sector workers was found to be 21%. Of the workers diagnosed with asbestosis, 59% had less than 5 years of exposure to asbestos; 22% had 5-10 years, 15% had 11-20 years and 4% had 20-30 years exposure.

Lung function tests on these workers revealed high levels of obstruction, but only somewhat lower levels of obstruction were found in an unexposed control group. It was possible that individuals in the control group had been exposed to asbestos through living in close proximity to asbestos units, or by having worked with asbestos in the past. Since any such employment would have been unrecorded there was no way to verify the history of such persons.

It should be noted that all the diagnosed workers were domestically exposed to unprocessed cooking fuel smoke. Hence, the reason for them developing asbestosis earlier than normally found may be either, high exposure to tremolite asbestos, generally acknowledged to be highly fibrogenic, or double exposure: domestically to cooking fuel smoke⁴ and occupationally to asbestos. Further predisposing factors also cannot be ruled out.⁵

In the organized-sector plants, 26% of the workers tested were diagnosed with asbestosis; their exposure was mostly 25 to 40 years. Most of these workers used clean gas in their domestic environments.

However, conditions in the organized sector were also found to be poor: housekeeping was bad and we found torn-open asbestos bags in some units allegedly using all the modern technologies. For both sectors, the survey revealed little

concept of the proper disposal of asbestos waste.

Many studies have demonstrated that asbestos can exhibit genotoxicity alone^{6,7} or act as a carrier for additional carcinogens, like benzo-a-pyrene from cigarette smoke. The survey demonstrated an enhanced induction of chromosomal aberrations and micronuclei in the peripheral blood lymphocytes of workers from small-scale asbestos units compared to control groups of smokers and non-smokers. Lohani et al. 2002 have demonstrated an enhanced genotoxic effect in smokers as compared to non-smokers both exposed to asbestos fibers in an organized-sector asbestos-cement factory.⁸ Chromosomal aberrations and micronuclei formation are strong indicators for risk prediction at the genetic level.

The survey demonstrates that neither small- nor large-scale asbestos-based industries follow the so-called "safety norms" laid down by the Indian government or reputable international agencies. By not doing so they are greatly increasing the risk of their workers developing debilitating diseases and fatal asbestos-related malignancies. The processing of asbestos (mainly tremolite) and manufacturing of asbestos products in the small-scale units of Rajasthan with workers using no personal protective equipment, presents a grave health hazard. Due to the latency of asbestos-related diseases it may be decades before the true consequences of such reckless handling of this dangerous material become evident. Although the study described above was conducted in 2001-02, visits to asbestos-using industries shows that, even today, many workers involved in these industries are not adequately aware of the severe consequences of asbestos exposure. (Dave and Beckett, 2005 have also described the lack of occupational hygiene in small-scale asbestos mines and manufacturing units in India.⁹)

Countless studies have shown that all varieties of asbestos are fibrogenic, co-carcinogenic and carcinogenic. Accordingly, many countries have banned the use of asbestos and are embarked on the difficult task of eliminating asbestos hazards in their infrastructure and buildings. It is now very important for countries where asbestos is still in use to impose similar bans, not only to protect workers being currently exposed but also to safeguard coming generations.

Both small- and large-scale manufacturing units for asbestos-based products have turned out to be extremely profitable for their owners, but a deathbed for the poor workers who, particularly those working in small-scale units, either have no knowledge of asbestos hazards or have to keep their mouths shut to preserve their jobs and avoid destitution.

The only way for the government to remedy the situation in these industries is to implement a complete ban on the mining and use of asbestos and promote the use of alternative materials. Members of the EU and other enlightened countries that have banned asbestos have shown that life without asbestos is perfectly feasible.

DUMPING HAZARDOUS WASTE IN INDIA: TOXIC SHIPS

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INTRODUCTION

Hazardous Waste

India has laws that expressly prohibit the import of hazardous waste, including asbestos waste. Yet, as recently as September 2007, the Supreme Court implicitly

ruled that hazardous wastes can indeed be imported if contained in other waste items – namely end-of-life ships. The law, counsel for the government claimed, was not intended to cover internalized waste, which would only be released after such vessels were scavenged. Astonishingly, the Court accepted this argument as they did the assertion that over 80% of the asbestos on board the Blue Lady – the disposal of which was under discussion – was suitable for recycling.

Permission to dismantle the Blue Lady, aka SS Norway and SS France, was given despite the fact that several days earlier the Court had issued a general order on ship-breaking, strengthening the quite stringent conditions it had decreed in 2003. Curiously, even under the 2003 rules, dismantling of the Blue Lady should not have been permitted. In another move, the Ministry of Environment and Forests (MoEF), in the same month as the above ruling, released proposed Draft Hazardous Materials (Management, Handling and Transboundary Movement) Rules, 2007 which, if adopted, would allow the Indian recycling industry to further bypass international conventions regarding the transport of hazardous materials.

The Alang Ship-breaking Yard

While the proposal to “reclassify” waste has met with universal condemnation, India’s ship-breaking regulations have been given tacit approval by the International Maritime Organization (IMO). Following a visit to Alang, India’s prime ship-breaking facility, IMO Secretary General Efthimios E. Mitropoulos said: “The new regime governing ship recycling in India, as recently decreed by the country’s Supreme Court, is remarkably similar to the requirements of the draft text of the new IMO Convention.”

The new convention, due to be approved in 2009, seeks to regulate all aspects of ship-breaking, including documentation, prior notification, legality of sale transactions and conditions in ship-breaking yards. One notable departure from earlier practice is that removal of hazardous materials will be permitted at approved ship-breaking yards. Regarding conditions in India,

the IMO Secretary General said there did not: “appear to be any major requirements for the recycling yards in excess of those laid down by the decision of the Supreme Court.” This all sounds fine, and indeed, much in the proposed convention is admirable, but do previous examples of enforcement of Supreme Court directions give confidence for the future – and what are the conditions in the Alang yards which have been approved by the IMO?

To highlight the way in which the Court and government ministries have acted in the past regarding hazardous ship-breaking, three prominent cases are reviewed. However, it is hardly encouraging that, since the Supreme Court order of September 6, 2007, there has been considerable confusion over required licences and approval procedures; by February 2008, 53 ships had “beached” illegally at Alang, with the Gujarat Maritime Board (GMB) apparently powerless to stop them.

Surprisingly, in view of all the international attention it has attracted, ship-breaking at Alang is in the doldrums. Lying 50km southeast of Bhavnagar in the state of Gujarat, Alang had the reputation of being the largest ship-breaking facility in the world, with 183 ship-breaking lots (individual yards) handling more than 300 ships a year and employing upwards of 40,000 workers directly and an estimated 200,000 in ancillary occupations. In recent years there has been a sharp decline in activity: in one five-month period in 2006 only 32 ships were dismantled by around 4000 workers and 2007 saw only a moderate revival – 71 ships and possibly 10,000 workers. However, future changes in the scrap steel market and regulation of overseas competition could see huge numbers of migrant workers return to the beaches and the hazards of this dangerous industry.

A report by a Supreme Court appointed panel in 2006, quoted fatal accident rates in ship-breaking of 2 per 1000 as opposed to 0.34 per 1000 in the mining industry. The same panel estimated asbestosis in ship-breaking workers to be around 16%. Greenpeace and the International Federation of Human Rights put the fatal accident rate at Alang still higher: at 50-60 per year.

Whatever their numbers at any particular time, those first in line to be damaged by toxic ships slipping through international and Indian controls are thousands of migrant and casual workers driven by poverty to the Alang yards; then the local communities whose environment is already heavily contaminated. After that, materials like recovered asbestos may pass deep into India, spreading their poison further.

The workers have been described as poorly equipped and inadequately trained. Not so long ago one reporter pictured the scene at Alang as “Dickensian,” with swarms of half-clad workers virtually tearing ships apart with primitive hand tools. Conditions

have undoubtedly improved in recent years with the supply of some protective clothing and rudimentary training, but it is hard to believe that sophisticated asbestos removal procedures based on those used in Europe and the US, for example, could easily be introduced.

A picture in a 2006 Frontline article* showed workers removing asbestos from a pipe in a partially screened-off area. They appeared to be in inadequately sealed protective suits and wore full masks or respirators of some sort. No air lines could be seen in the rather small picture, but if they were wearing respirators there is no way of knowing how efficient they were – only the best will give adequate protection, and then only when external fiber concentrations are kept low. Also, the enclosure – a skip-like structure – was scarcely shoulder height and close to other facilities, obviously not an ideal situation; there was no indication of how clothing was to be changed to avoid contamination. The greatest worry concerns the removal of such pipes from the ship itself. The Supreme Court order talks of using proper enclosures on board ships in future, but this is only for certain categories of work. For other types of asbestos removal, wet stripping (presumably without enclosures) has been ruled adequate.

There will undoubtedly be some improvement in documentation as a result of the Supreme Court’s rulings. But does the IMO truly believe that sophisticated safety measures will be observed in practice to protect the health of easily-replaced workers, amid the mayhem of the breaking beaches; particularly, if business starts to boom again, with profits relying on increasingly rapid turn-rounds on the sprawling lots of Alang.

At present, Alang is still a no-go area for the media and activists; permits are difficult to obtain, photography is frowned upon, and men with shotguns police the yards. In this climate how can there be any confidence that safety criteria will be observed. Clearly, neither the government nor the Alang Ship Breaking Association want the experiences of the casual and migrant workers to be revealed to the world at large.

The Association has the ear of government, is even able to influence the outcome of elections – in Bhavnagar South, recently, a fiercely pro-ship-breaking National Congress candidate was elected, bucking the State trend to the BJP party. As will be shown in the discussion of the Blue Lady and other toxic ships, government ministries have, in the past, sympathized with the ship-breaking industry to the extent of manipulating Supreme Court judgments.

The workers themselves, however, are effectively disenfranchised. Unable to find work in their home villages and townships, they come from Uttar Pradesh, Orissa, Bihar and Jharkhand.

The ancestors of V.S Naipaul, the Booker Prize winning author, came from such a village in Uttar Pradesh, but for the majority of the Alang workers even the right to vote is a distant dream. Few among this drifting population even possess election identity cards, most have never voted. No profit for political parties in courting their votes, but it can’t be right that they should be abandoned by their nation.

THE CASE OF THE BLUE LADY

Supreme Court Supports the Ship-breakers

By every rule in the book, the Blue Lady, carrying asbestos waste and radioactive materials, should not have been allowed into Indian waters, let alone be beached at Alang. And yet, despite well-premised objections, the central government has persuaded the Supreme Court to rule that this ship be dismantled there. The judgment was in relation to an application submitted to the Court, by the author of this article, asking the Court to prevent dismantling of the Blue Lady, principally as such would be contrary to the Court’s own Order of 2003. As of writing, the case is still ongoing in that a further application for clarification has been accepted for consideration by the Court.

The controversial decision came in the second of two related judgments in the matter of ship-breaking and hazardous waste issued by the Supreme Court on September 6 and 11, 2007. Justices Dr. Arijit Pasayat and S. H. Kapadia delivered both the orders. The first order contained new rules applicable to ship-breaking generally, following from earlier deliberations on the Clemenceau case (briefly outlined below). The second order made specific reference to the status of the Blue Lady, a ship known to contain dangerous substances – including asbestos and radioactive materials – then currently beached at the Alang shipyard, though lacking clear authorization to be there.

This second order gave the go-ahead for the dismantling of the ship, and laid down some conditions on how the process was to be conducted. However, the Court did not dispute that the entry of the Blue Lady into Indian territorial waters and its continued presence since June 2006 was itself in violation of the Court’s own order of October 14, 2003. It was also in violation of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, and a number of other international environmental and labor conventions and treaties that govern the breaking of contaminated ships – to all of which India is a signatory.

Ship-breakers Denied – the Clemenceau

To understand how extraordinary was the decision in the Blue Lady case it is necessary to look at what happened to the Clemenceau, a former French warship which had been permitted, by a

*Lyla Bavadam. Profits over Safety. Frontline. 2006, Issue 02; online: <http://www.flonnet.com/fl2302/stories/20060210007701100.htm>

French court, to set sail from France on December 31, 2005, bound for disposal at Alang – despite claims that it contained up to 1000 tonnes of asbestos.

A storm of protest had preceded the ship's departure and continued as it made its way toward India. Responding to this outcry and acting on advice from its Monitoring Committee on Hazardous Waste Management (SCMC), on January 16, 2006, India's Supreme Court banned the ship from entering India's Exclusive Economic Zone (EEZ). Within a month, on February 13, the Supreme Court considered a further report of the SCMC concerning the *Clemenceau*. However, Justices Arijit Pasayat and S. H. Kapadia questioned the competence of the SCMC to advise on toxic waste in relation to the scrapping of the ship and proposed the formation of another panel of experts comprising retired Navy and DRDO (Defence Research and Development Organisation) personnel, preferably with dockyard experience.

The Court was scheduled to reconvene on February 17 to consider the matter further, but on February 15 events in France preempted any action by India. Responding to petitioners Comité Anti-amiante de Jussieu (anti-asbestos committee of Jussieu), Andeva (National Association of defense of asbestos victims) and Greenpeace, the French Supreme Court reversed the lower Court's decision allowing the ship to leave France for scrapping without prior decontamination. Accordingly, three days before his arrival in India on a brief visit, President Chirac ordered the recall of the *Clemenceau*.

With a general consensus in Europe that the export of hazardous waste in the manner that had been intended for the *Clemenceau* was illegal, there was some talk of the French government facing prosecution. In India, however, the issue of whether such ships should be admitted had serious economic repercussions and the Supreme Court addressed the matter in the February 17 hearing, originally intended to consider the *Clemenceau* case alone. As a means of determining if the infrastructure and operating procedures at Alang were adequate to prevent "environmental hazards and pollution" and where deficiencies were found of recommending "remedial measures," the Court ordered that there should be constituted "a committee of technical experts." This duly constituted "Technical Experts Committee on Ship Breaking" (TEC) features prominently in the *Blue Lady* case, where its not so reliable recommendations were accepted too readily by Supreme Court Justices. In addition to the retired naval officers requested by the Court, the 12-member committee included several members from government ministries and state industries as well as academics from government institutes.

Misleading Evidence Leads to Blue Lady Verdict

In its decision on the *Blue Lady* the Supreme Court was particularly concerned with a question at the heart of the Indian economic boom, namely the balancing of individual hardship against benefits to the community at large:

"It cannot be disputed that no development is possible without some adverse effect on the ecology and environment ... The comparative hardships have to be balanced and the convenience and benefit to a larger section of the people has to get primacy over comparatively lesser hardship."

As the case progressed, the "balance" sought by Justices Pasayat and Kapadia apparently caused them to lean too heavily in favor of forces of economic liberalization in their too ready acceptance of doubtful evidence submitted by government agencies and the Court's own committees.

Presence of Radioactive Elements Verified

In making its order the Supreme Court relied on a submission by Gopal Subramaniam, the Additional Solicitor General, claiming that the *Blue Lady* no longer contained any radioactive material and her beaching was irreversible. The former claim was based on an inspection by the Atomic Energy Regulatory Board (AERB) and GMB on August 14, 2007 which had been ordered by the Court following a petition by myself. The inspection had revealed the presence of 12 smoke detectors containing radioactive Americium 241. Following removal of the offending items the inspection teams reported that the ship: "now, does not contain any radioactive material." However, a perusal of the report shows that the entire inspection of 16 floors of the 315 meter ship seems to have been completed within a period of 4 hours (commendable alacrity, but was it thorough).

In my petition, I had referred to a letter sent by one Tom Haugen (who had been the Project Manager for Engineering, Delivery, Installation, Commissioning and later services and upgrades as regards fire detection installation systems on board the *Blue Lady*). Haugen had written to Meena Gupta, Chairman of the TEC that the fire detection system on the *Blue Lady* contained 5500 detection points which included 1100 ion smoke detectors containing radioactive Americium 241. In a separate letter to the Prime Minister dated 19 September 2007, Haugen has reiterated the fact about the quantity of radioactive material on the ship, pointing out that he himself had supervised its installation. Countering the AERB-GMB report that the ship did not contain any radioactive material after their inspection, Haugen wrote that in most cases, the fire detection systems are not labeled or indicated in any way, as they are typically "buried" out of sight. According to Haugen, due to the risk of hazardous radioactive exposure, they should only be

handled by professionals or certified technicians. "The system and its detectors are very subtly placed and virtually completely hidden in most parts, so it is totally understandable that a non-expert team might miss it during a broader inspection of the vessel," wrote Haugen.

To put all this in context, it should be pointed out that way back in 2006 the TEC had reported that there was no radioactive material at all on the *Blue Lady*, as did the Gujarat Pollution Control Board (GPCB), Gujarat Enviro Protection and Infrastructure Ltd, (GEPIL) and the ship's current owner Priya Blue Shipping Pvt Ltd. However, one of the Committee members, Dr. Virendra Misra of the Industrial Toxicology Research Centre (ITRC), Lucknow, had disagreed with the findings, particularly mentioning smoke detectors. This was ignored by the TEC's then chairman, Prodipto Ghosh, who alone signed the final report.

Following this flurry of claims and counterclaims, and in spite of inspection reports, radiation risks aboard the *Blue Lady* remain the same: there are still over one thousand items of equipment containing radioactive material on the ship and Haugen has a diagram showing where they are all located.

Presence of Asbestos Verified

Regarding the presence of asbestos in the ship, Additional Solicitor General Subramaniam saw fit to argue ingeniously: "In the present case, the vessel does not contain a single kilogram of asbestos and/or ACM as cargo." But, of course, it had never been the stand of the plaintiff that asbestos or asbestos-containing materials (ACMs) were present as cargo – they were built into the ship's structure.

The question of differentiating between inbuilt material containing asbestos and asbestos cargo had, in fact, already been addressed by a Parliamentary Committee. The Parliamentary Committee on Petitions, on August 17, 2007, issued its report in response to the matter being raised in Lok Sabha by Basudev Acharya. Senior parliamentarian Acharya had petitioned the Committee, arguing that the *Blue Lady*'s entry violated India's sovereignty. Incidentally, the MoEF presented oral evidence before this Committee, but here also failed to disclose possible radiation risks.



The Parliamentary Committee, chaired by Prabhunath Singh, in its response, noted that it was extremely concerned that the ship contained an estimated 1240 tonnes of ACMs and about 10 tonnes of PCBs inbuilt in its structure. After remarking on the carcinogenic properties of both product types, the report got into the issue of asbestos in the cargo of ships as opposed to structural asbestos. Virtually indicting the government, the report stated:

"The committee strongly deprecate (sic) the repeated stand taken by the ministry that since no hazardous wastes have been allowed on board as cargo, there is no violation of the Hon'ble Supreme Court directions. The Committee need not emphasize that hazardous wastes whether as cargo or inbuilt material are equally detrimental to the environment and to the human health."

Earlier, Kalraj Mishra, a member of the Parliamentary Committee on Industry, had argued that since the French ship *Clemenceau* had been sent back to its country of origin, the *Blue Lady*, being 50 times more toxic than the *Clemenceau*, should also be sent back.

It appears that the Supreme Court has accepted the government standpoint that the ACMs contained in wall partitions and ceilings (85% of total ACMs in the ship) do not pose a risk if the panels containing them can be removed undamaged. No mention seems to have been made of the other 15% which translates as 186 tonnes. This is likely to be much more friable material and its removal will subject workers to grave risks of asbestosis, mesothelioma, lung cancer and other asbestos-related illnesses.

In my petition, I brought to the notice of the Court that asbestos waste is banned in India and asbestos itself is banned in some 44 countries and even the World Trade Organization had passed a verdict against it because of its carcinogenicity at every level of exposure. There is indisputable evidence that safe and controlled use of asbestos is impossible. Despite this, the Additional Solicitor General Subramaniam claimed that: "Safe use and controlled use of asbestos is possible in India." Further, he contended that the asbestos waste in the structure of the ship was not hazardous and the ban on asbestos waste in India applied only to "virgin" asbestos waste!

The Supreme Court has not yet dealt with an application filed by Bhagvatsinh Haluba Gohil, Sarpanch, Village Sosiya, Tehsil Talaja, and District Bhavnagar on behalf of 30,000 villagers and 12 panchayats of the Bhavnagar district of Gujarat. The residents of the villages sought to prevent the dismantling of the Blue Lady on account of the large amount of asbestos on board which could contaminate their villages, close to the Alang yards.

Faulty Argument on a Beached Ship not Being Refloatable

There's more. Allen Todd Busch, Vice President and General Manager, Titan Salvage, a Crowley Company, one of the largest and most respected salvage companies, also wrote to the Prime Minister. He said, "The primary reason the court has ruled in favour of breaking the vessel, in its current position, is because there is a belief that the vessel can not be removed from where it now rests." Claiming that his firm had the capability and expertise to refloat the vessel, Busch continued: "Please allow us to present to the Prime Minister and India's Court our credentials, history and experience that there is actually very high probability that the Blue Lady is not at all in an 'irreversible' position, as the esteemed Court has found." Supporting this view, Aage Anderson, a firm involved in the Clemenceau case, affirmed in a technical memo that the Blue Lady could be refloated.

The fact that the Additional Solicitor General Subramaniam was able to convince the Court that the beaching of the Blue Lady was irreversible, was sufficient to override all other arguments regarding the legality of the ship's presence in India.

Dangerous Precedent for Globalization of Waste

In my petition to the court I pointed out that the Prior Informed Consent procedure, which has been incorporated in the Rio Declaration, Basel Convention, Cartagena Protocol, Rotterdam Convention, and Stockholm Convention, was also incorporated in Hazardous Wastes Rules 1989. As per this principle, no member state can send hazardous waste to a developing country without its prior consent. This protocol has not been followed in the case of the Blue Lady. Another important principle states that ships should be decontaminated prior to being exported for dismantling. The Supreme Court itself has previously declared this to be an essential prerequisite for acceptance of a vessel for recycling on Indian territory.

Since the Clemenceau had been recalled in early 2006, it might have been expected that, by September 2007, a similar recall would have been issued in the case of the Blue Lady, which departed from Germany in 2005. But, exposing differing interpretations of international conventions among European nations, Germany has failed to honor the Basel Convention and has

not recalled the ship. Meanwhile, the owners of the Blue Lady have escaped the high cost of decontaminating the ship in Europe.

The Scrapping of the Riky

First, a ship with dubious credentials leaves the shores of Denmark. Then a month later, India allows it to beach at Alang for scrapping. In between, it gets a new name and rules are flouted to let it in. Here chronicled is how the Riky, unlike the Clemenceau, sailed through the law. Though the case of the Riky preceded that of the Blue Lady, it is still being considered by the Supreme Court. Meanwhile, the ship-breakers are violating earlier Supreme Court orders with impunity.

On April 15, 2005, Connie Hedegaard, Denmark's Environment Minister alerted her Indian counterpart A. Raja (currently heading the Communications Ministry) to the illegal movement of a 51 year-old asbestos laden ship, Kong Frederik IX. The ship was on its way to Alang for scrapping. The ship's new owners, Jupiter Ship Management, a Mumbai-based company, had renamed it "MV Riky."

Hedegaard wrote: "I write to you on a matter of great concern for me as Minister for the Environment in Denmark – the illegal traffic of hazardous substances in ships." She told Raja that the Kong Frederik IX had left Denmark on March 16, 2005, allegedly to operate in the Middle East as a cargo ship; presently it was passing through the Suez Canal on its way to the Red Sea. However, Hedegaard had learned from "several independent sources" that, contrary to the information given by the owners, the ship was in fact ultimately bound for the west coast of India to be dismantled; it could arrive within a week.

Hedegaard referred to the provisions of the UN's Basel Convention, of which Denmark, India and 168 other countries are signatories. In accordance with the Basel Convention, a ship must be characterized as waste if the owners intend to dispose of it. Further, transboundary movement of hazardous substances without prior notification should be deemed as illegal traffic in waste.

The Danish minister appealed to the Indian Environment Minister saying, "I believe our interests are joint – and I call on you to co-operate in this case by denying [permission for] the ship to be dismantled in India and refer the ship to return to Denmark to be stripped of the hazardous waste." She added that by so doing, India and Denmark could send a strong signal: that neither country would accept export of environmental problems that could be solved locally, and that "we – as governments – will not accept this kind of foul play which results in lasting damage of the environment."

Responding to Hedegaard on April 28, 2005, Raja wrote: "As you are aware India is a party to the Basel Convention since 1992 and has strengthened the national legislation on Hazardous Wastes management notified in 1989

to ensure compliance of our obligations under the Convention. We have determined that the ship cannot be classified as 'Wastes' within the scope of Art 2.1 of the Basel Convention." Raja argued that a ship sailing under its own power could not be classified as "waste." However, the ship in question, now renamed Riky, had finished its sailing days, having been beached at Alang five days earlier, on April 23, 2005.

In the same letter Raja informed Hedegaard that, according to the GMB, GPCB and the Central Pollution Control Board (CPCB) who inspected the ship, there was no objectionable hazardous material on the ship: "There are only inbuilt insulation materials which are part of the structure of all ships. As per Indian Laws and our position under the Basel Convention and the IMO, the ship has the requisite permission for beaching." He assured her that India had the capability to ensure environmentally sound dismantling of the ship and disposal of its contents.

At around the same time as Hedegaard's letter, Per Stig Moller, the Danish Minister of Foreign Affairs also wrote to K. Natwar Singh, the then Indian Foreign Minister. This was followed up by meetings between Michael Sternberg, the Danish ambassador in Delhi and Pradipto Gosh, the top bureaucrat and then Secretary of the MoEF. Nothing changed.

Mystery surrounds the arrival of the Riky at Alang. N B Deshmukh, Assistant Commissioner, Customs Division, Bhavnagar, Gujarat said that the Riky was carrying the flag of the Democratic Peoples Republic of Korea (North Korea). However, Madhumita Dutta, who later in 2005 challenged the MoEF in the Supreme Court on the ship's admission into India, alleged that the Riky sailed in under the flag of Roxa, a non-existent country.

Subsequently, on June 2, 2005, the SCMC granted permission for the Riky to be dismantled, subject to the presence of officers from the CPCB and GPCB. The SCMC was set up by the Supreme Court in October 2003 to monitor the progress in implementation of Hazardous Waste (HW) Rules as well as a series of orders on hazardous waste matters passed by the Court. Prior to their decision, on May 24, 2005, Dutta had written to the SCMC, alleging that the registration document for renaming the ship had been fabricated to confuse the Danish authorities and thus facilitate beaching of the vessel. Despite all the protests, the SCMC decision was implemented and the Riky was dismantled following a final GMB go-ahead on September 23, 2005.

It should be noted that serious repercussions soon followed the facile beaching of the Riky. Even in the interim between the Riky's arrival and the SCMC's decision, other controversial ships were turning up. It was the Danish Environment Minister who again wrote to Raja warning that two Danish

ships, the Dronning Margrethe and the Rugen, had set sail for India but "disappeared" on the high seas. Asbestos was mentioned: it's a "case of illegal traffic of hazardous waste," her letter stated categorically. A familiar pattern followed: international laws were flouted and the Dronning Margrethe under the name "Beaumont II" was welcomed by India with open arms.

Was the Government of India's decision to let in the Riky illegal and wrong?

Breaking Every Law in the Book

The direction to dismantle the ship was issued despite the fact the Basel Convention specifically categorizes ships destined for scrapping as "wastes." Having left Denmark without notification of its hazardous content Riky's transit to India did not fulfil the minimum requirements of the Basel Convention. Since its voyage was not authorized by Denmark, the ship's papers could not have included Form 7, a necessary document for import and export of hazardous wastes both under Indian and International law. However, having deemed end-of-life ships as no longer "wastes" the Government of India disingenuously waived this requirement, knowing full well that under the Basel convention if one party considered the ship "waste" – and Denmark clearly did – then that was sufficient for the Riky to be so classified.

The SCMC chose to ignore negative observations made in the report of the joint inspection team of CPCB and GPCB officials that visited the ship on April 26, 2005. The team found:

- ◆ no detailed inventory of inbuilt materials (including asbestos, glass wool etc.) in the inventory prepared by Customs;
- ◆ the workers on the plot (ship-breaking unit) were little equipped to handle the asbestos waste believed to be on the ship and lacked suitable training;
- ◆ little purpose served in carrying out the post facto inspection since the GPCBs guidelines specifically require an inspection and an inventory prior to beaching.

Addressing some of these points, they recommended that it should be ensured that ship owners provide the GPCB with a detailed inventory, not only of cargo, but also of inbuilt hazardous materials, well in advance of a request to beach a vessel.

The Challenge in the Supreme Court

On August 13, 2005, an intervention application was filed in the Supreme Court challenging the contentions of the MoEF on the admission of the Riky. The court was informed of the violations involved in allowing the Riky to beach at Alang, including violations of the Court's own orders of October 2003. The application was moved by Madhumita Dutta, on behalf of a voluntary group named Corporate Accountability Desk.

The application asked that the Government of India be directed to cooperate

with the Government of Denmark, as a party to the Basel Convention, and furthermore initiate an enquiry into the illegal entry of the ship. The applicant also called upon the Court to take appropriate action against concerned officers of Gujarat Maritime Board, Gujarat Pollution Control Board and Customs Department, Bhavnagar as well as the MoEF and the Minister himself.

On September 12, 2005, M. Subba Rao, as Member-Secretary of the SCMC filed an affidavit in the Supreme Court refuting the claims against the MoEF in the matter of Riky. However, the fact that Subba Rao is also an Additional Director at the MoEF demonstrates the conflict of interest, which appears to have compromised the independence of the SCMC. The SCMC's membership comprises bureaucrats from the very government departments that are defendants in hazardous waste cases being currently heard by the Supreme Court.

Dr. Claude Alvares, another member of the SCMC, said that the affidavit filed by the SCMC represented the position of the government and not the SCMC:

"I was wholly unhappy with the Riky affidavit filed on behalf of the SCMC. Others in the SCMC agreed with me. I made a lot of noise in the SCMC about it because that affidavit was prepared by the MoEF and the GPCB, both of whom are respondents in the petition on hazardous wastes, and filed in the name of the SCMC. We thought our objections would be taken on board. They were not."

He also noted that none of the Riky documents were shown to any of the SCMC members.

But why did the Supreme Court allow the independence of its own committee to be compromised? Why create a committee to oversee government enforcement of hazardous waste rules, and then let government officials themselves sit on it? The Supreme Court generally asks the government to suggest names or asks them to constitute its committees; the government blatantly ignores the principles of natural justice and conflicts of interest. Ministries make their own officials members of such committees – they have done so in several other cases. For instance, there is another committee, the "Supreme Court Committee on Waste to Energy," where there is a similar conflict of interest.

On September 15, 2005, responding to critical press reports, the MoEF went on the offensive by issuing a press release. Their first target was Denmark: they claimed to have not received any communications from the Danish Minister for Environment since April 2005. This, of course, was not true and Hede-gaard, no doubt weary of the MoEF's duplicity, expressed disappointment at the misrepresentation of her government's actions. Then they turned their attention to international agreements, pointing out imagined disparities between guidelines on ship-breaking

provided by the IMO, the International Labour Organization (ILO) and the Basel Convention. Another bogus argument (at that time, at least); for in fact a Joint Working Group on Ship Scrapping was established by IMO, the ILO and the Conference of Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, for a more cohesive approach to the problem. The group concluded its second meeting in Geneva in December 2005.

The MoEF press release also mentioned that the Riky had a "cargo free certificate issued by the Customs Department, as the vessel arrived at Alang in ballast (empty)." The difference in voices within the arms of the government continued. On September 30, 2005, N B Deshmukh (Assistant Commissioner, Customs Division, Bhavnagar) said in an affidavit that the quantity of structural material in the Riky that could give rise to hazardous waste was unknown to the customs authorities. But the MoEF and SCMC contended that Customs authorities had boarded the ship at anchorage and had not found any hazardous waste. Why were the MoEF and SCMC interpreting an "I don't know" as a "not there" with regard to hazardous waste on the Riky?

In an interview for Frontline, a news magazine and in conversation with me in early 2006, Alvares said, "The MoEF is the last institution in this country that is concerned about the environment." In noting that the SCMC received a report saying that the asbestos waste generated on demolition of the Riky was 222 kg, whereas the Danish authorities claimed the ship contained 17 tonnes of ACMs, he said that the SCMC wanted to re-examine this aspect of the matter. Implying that ships like the Riky fell into a special category, he continued:

"We took serious note of Riky and then Clemenceau because we found that in the case of Riky, the Danish government objected to the export of the ship, and in the case of Clemenceau, we had indication that decontamination was not done as required by the Supreme Court order and the directions of the SCMC. These are fairly logical decisions. Other ships continue to come to Alang, but follow the norms given in the apex court order."

SCMC members including Alvares have voiced scepticism about the motives of the Danish government, being unaware of any action taken against the owners of the Riky. The facts, however, are quite different: when the Danish authorities became aware that the ship had arrived off the Indian coast bound for the Alang shipyards, they immediately instituted proceedings against those responsible. On April 25, 2005, the Danish Police were directed to seek and prosecute companies and persons responsible for this violation of EU shipment regulations, the Danish Act on Protection of Environment and the Danish Criminal Code. The role of the Danish city of

Korsør is also under investigation, as local authorities may have committed an error by granting permission for the ship to leave the local harbor.

Following tension between the SCMC and the MoEF, the SCMC appointed advocate Raj Panjwani as their counsel. It appears the SCMC wished to avoid MoEF officials filing affidavits on their behalf with the Supreme Court. The Court approved Panjwani to appear on behalf of the SCMC in February 13, 2006; up to that point, the SCMC did not have its own independent counsel.

Bleak Outlook for Hazardous Waste Regulation

Tackling illegal and hazardous waste movement has been on the international agenda in different forums for a long time. However, in India, little overall progress has been made since 1995 when the Supreme Court took cognizance of one Bhopal-based Bharat Zinc Company importing hazardous zinc ash waste without following relevant procedures. Although the Court had pursued the entire issue of hazardous waste for over 10 years, the Riky case illustrated that in the absence of compliance with the Court's orders, the situation had come back to square one.

In dealing with the Riky the SCMC appeared to act as an implementer of MoEF policy. An affidavit filed at the Court alleged that both the SCMC and MoEF along with Customs had misinterpreted several provisions of both national and international law in a manner that seemed "mischievous." A dangerous precedent was set for gaining approval for the dismantling of ships in contravention of the law.

The Riky and the Blue Lady are remarkable only in the amount of hazardous materials they contained and the public attention they have attracted. To reveal the true extent of illegal beaching and breaking operations, the GMB should be required to submit to the Court a comprehensive list of ships that have beached at Alang subsequent to the Court's order of October 14, 2003, along with the papers required for their entry as laid out both under the Basel Convention and India's Hazardous Waste Management Rules.

Conclusion

Dismantling of the Blue Lady would set a dangerous precedent. Hazardous and poisonous material does not become

non-hazardous and non-poisonous merely because the government – the MoEF and an Additional Solicitor General – proclaim it to be so. The Blue Lady story illustrates the means by which not only hazardous substances, but dangerous industries also have been transferred to India, often quite openly, with the connivance of Indian authorities. In this instance, the government steered the highest court in the land toward the rulings the ship-breaking industry wanted. Apart from submission of dubious technical evidence the authorities even resorted to humanitarian appeals: the original permission to beach the ship in 2006 having been granted not on account of legality, but on the humanitarian grounds that it faced dangerous weather conditions at sea.

As of February, 2008, the situation at Alang remains confused, as shipowners await clear guidance from the Supreme Court. Matters pertaining to applications for clarification, which came up for hearing on October 23, 2007, remain sub-judice; these concern the quantity of various toxic and radioactive substances on board the Blue Lady, how decontamination will be done, the scientific basis of the decision that beaching was not reversible, the position regarding the original and illegal entry, anchorage and beaching of the ship itself, among others. At this hearing, the Additional Solicitor General asked for more time to formulate a response. Meanwhile, as mentioned previously, 53 ships have beached illegally, with the owners unable to get any clear approval or rejection of applications to beach.

While India has gone ahead with its own rules for "safe ship-breaking," the IMO is close to finalizing new guidelines. The IMO is set to overturn the conventional wisdom of removing hazardous materials before sending ships for scrapping, and seems satisfied that India has laid down adequate guidelines for hazardous materials to be handled safely at Alang. But the safety of workers depends on implementation not rhetoric. As has been shown, Supreme Court Orders can be circumvented and whatever improvements might be made at Alang the greatest protection of migrant and casual workers from asbestos hazards would be for ships to arrive there asbestos-free.





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Snapshot of Current Asbestos Use in India

Asbestos – the so-called *magic mineral* of yesteryears – was single handedly responsible for thousands of industrial deaths in the 20th century and is continuing to take its toll, even in countries that have completely stopped its use, such as Australia. Realizing the dangers, more than 40 industrialized countries introduced bans on its production and usage. With dwindling markets in developed countries, the global asbestos industry is focusing on emerging markets such as India where weak legislation and few occupational health safeguards provide ideal conditions for the expansion of the asbestos sector.

The Indian economy is growing in all spheres with a GDP growth of about 8.7% for the financial year 2007-08.¹ The construction industry is thriving needing to cater for a billion plus population, it is very large employing 31 million people and is second only to agriculture in terms of employment; it contributes 20% of GDP.² In India, the vast majority of asbestos products (nearly 80%) are used for rural low-cost housing, schools and industrial structures in India.³ Asbestos-cement production increased from 0.68 million tons in 1993-1994 to 1.38 million tonnes in 2002-2003.⁴ In 2006, asbestos consumption in India was in the region of 280,000 tonnes making it Asia’s second largest user, after China. Direct and indirect employment in asbestos-related industries and mines is around 100,000 workers (*Ramanathan and Subramanian, 2001*).

Risking Workers’ Lives for Profits

Workers employed in the asbestos processing sector are ignorant of their ill-fated future. The same goes for the millions of construction workers who may be exposed during maintenance, renovation and demolition activities in buildings that contain asbestos. Many of these workers are in the unorganized sector and lack any awareness of the risks they are facing. Due to the lack of a sophisticated data collection system, it has been difficult to quantify the current incidence of asbestosis, mesothelioma and other asbestos-related illness in India or to make accurate epidemiological predictions. Researchers at the National Institute of Occupational Health and other institutions have reported numerous instances of high levels of occupational exposure to asbestos, indicating the potential for a future epidemic of asbestos-related diseases in India.

Trade Union Participation in the Global Ban Asbestos Campaign

The Building and Wood Workers International⁵ (BWI) has long been instrumental in voicing the concerns of workers in its trade sectors globally and in 1989 called for a global ban on asbestos at its congress. Since then, the BWI has played a prominent role in the global ban asbestos campaign and worked closely with stakeholders from asbestos victims’ groups and civil society to mount high-profile ac-

tivities such as Global Asbestos Congresses in Brazil (2000) and Japan (2004), and the Asian Asbestos Conference in Thailand (2006). BWI officials have engaged in continuous dialogue on asbestos with the ILO, the WHO and other key stakeholders; in June 2006, BWI-led efforts were prominent at the International Labour Conference in Geneva, where a resolution was adopted for the elimination of all further uses of asbestos globally. At the same time, the ILO publicly clarified the meaning of ILO Convention 162 on Safety in the Use of Asbestos, stating that it does not provide justification and/or endorsement of the continued use of asbestos. Inspired by the ILO, in 2006 the WHO also announced its much-awaited affirmative policy calling for the elimination of asbestos-related diseases worldwide.

The BWI has developed a global action plan on asbestos and has involved its affiliates in raising awareness of the asbestos hazard amongst members and lobbying for national bans on the usage of all forms of asbestos. In India, the BWI has 29 affiliated unions, many of which are organizing construction workers. In the southern state of Tamil Nadu, the BWI has seven affiliates, which have joined hands to form an umbrella federation – the Tamil Nadu Construction and Unorganized Workers’ Federation (TCWF). High on the agenda of this federation is the need to strengthen action on banning asbestos. At a recent federation workshop an unusual step was taken when a producer of non-asbestos roofing material was invited to make a presentation, which underlined the availability of safer and affordable alternatives in India. In Tamil Nadu state, the unions continue to focus their attention on asbestos-manufacturing units to establish contact with at-risk workers and victims’ associations. Based on the success in Tamil Nadu, similar trade union led initiatives could be replicated in other states. Organization of workers on this scale could eventually lead to a nationwide asbestos ban.

Key Action Areas in India

In a country of over a billion people with the majority of workers, many of whom are illiterate, belonging to the unorganized sector, raising awareness of invisible workplace hazards such as asbestos is not an easy task. People can visualize injuries from ladder falls and the collapse of scaffolding but explaining that an unseen fiber can cause a fatal disease in the far distant future is a very hard sell. Nevertheless, workers must be made aware of the asbestos hazard; they have a right-to-know how little their employers and Government value their lives. A strategy has been designed to bring home this message which employs a variety of resources and media, including: organization of mass asbestos awareness campaigns for workers and the public as part of activities held on International Workers Memorial Day (April 28); the identification of manufacturers producing safer alternatives in the construction sector and their

"Wherever ban asbestos campaigns have been pursued vigorously by BWI affiliates in India there have been positive results."

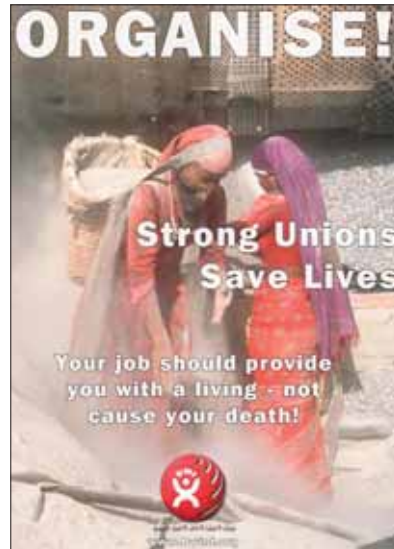
involvement in trade union led asbestos campaigns; exposing the leadership role played by the Canadian Government in the global asbestos lobby. Examples of recent union activities include efforts centered on April 28, 2008 such as:

- ◆ A letter-writing campaign by the Tamil Nadu Construction and Unorganized Workers Federation (TCWF) and Delhi Asangathit Nirman Mazdoor Union (DANMU – Delhi State Construction Workers’ Union) to draw the attention of the Indian Government and the national media to the need for a national asbestos ban.
- ◆ A joint interactive session with the Cancer Institute at Chennai by TCWF personnel with members of the Indian National Rural Labor Federation, Tamil Nadu.
- ◆ Worksite meetings in several locales in Tamil Nadu, Delhi, Gujarat and Kerala to raise members’ awareness of Occupational and Safety Health issues including asbestos; these activities culminated with candle lighting and commemoration ceremonies.

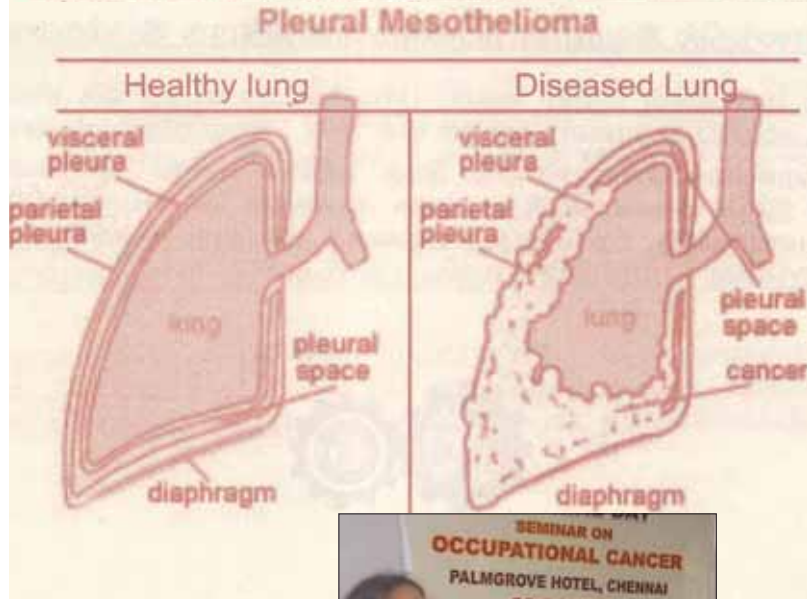
Throughout the year, BWI affiliates in India engage in capacity building among members which includes activities to raise awareness of the health effects of asbestos, the existence of asbestos-free products, the need for periodic health check-ups for at-risk workers, the feasibility of converting to safer industrial technologies and the failure of the Indian Government to implement ILO and WHO asbestos policies. Wherever ban asbestos campaigns have been pursued vigorously by BWI affiliates in India there have been positive results. While Ramamurthy Karnan, General Secretary of the TCWF, is rightly proud that “the regional trade unions have started to do their bit,” he urges “a more concerted effort from the national trade union centers to strengthen the trade union campaign to ban asbestos in India in the coming years.” Trade unions need to make common cause with other social actors if we are to build a truly national campaign to ban asbestos; these include: asbestos victims, environmentalists, academics, industry representatives, medical and legal professionals.

Conclusion

Sadly, while most industrialized countries have banned the use of asbestos, India’s consumption is increasing. That more and more of this toxin is being incorporated into our society when safer alternatives are available is scandalous; asbestos use can only flourish when elected officials and civil servants tasked with protecting occupational and public health turn a blind eye to the consequences. In India, the asbestos industry is strong but history is full of revolution. A people’s movement can definitely bring about a change for the better. Trade unions working in partnership with like-minded organizations need to step up their pressure on the Government of India to implement a national ban in order to save the lives of millions of workers as well as members of the public.



கூடுதல் வந்துள்ளது. மெஸோதீலியோமாவின் முக்கிய அறிகுறிகளாகவும் தொல்பொருள் மற்றும் உறுப்புகளுக்கு பரவும் குறைந்த அளவில் ஆஸ்பெஸ்டாஸ்டன் தொட்டி ஒப்பிடுவதால் தொல்பொருள் தொட்டியின் நோயினால் தாக்கப்படுபவர்களில் சிலவே இதனைப் பெறுகின்றனர். மெஸோதீலியோமாவை நோய் மறைந்திருக்கும் காலமானது பொதுவாக முயற்சி முதல் இரண்டு ஆண்டுகள் வரை இருக்கக்கூடும் என்றாலும், பீரிட்டின் நீடி மன்றங்கள், நோய் மறைந்திருக்கும் காலத்தை மிகக் குறைந்த காலமான பத்து ஆண்டுகளாக ஒப்புக் கொண்டுள்ளனர். நோய் கண்டறியப்பட்டபின் மெஸோதீலியோமாவை நோயாளிகள் சராரியாக பதினெட்டு மாதங்கள் முதல் இரண்டு ஆண்டுகள் வரை உயிர்வாழக்கூடுமென்றாலும், சிலர் இன்னும் அதிக காலம் உயிர்வாழவும் வாய்ப்புண்டு. தற்போது இதை குணப்படுத்தக்கூடிய, அறியப்பட்டுள்ள சிகிச்சைமுறை





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Visit to an Asbestos Mine

In Andhra Pradesh, there are asbestos deposits in Cuddapah, Kurnool and Mahabub Nagar Districts; however, the highest quality chrysotile is found near Pulivendla and Brahmanapalli in the Cuddapah District which is 400 km from Hyderabad. In Cuddapah, asbestos ore is obtained from underground workings. The mines here are semi-mechanized and employ board and pillar techniques. There are three asbestos mines in the area: the Saraswathi Brahmanapalli mine, the Andhra Pradesh Mining Development Corporation mine (which has been taken over by the owners of the Saraswathi mine) and the Saibaba mine at Ippatlaw.

I visited the Saraswathi Brahmanapalli mine, which is owned by Sri Y.S. Prakash Reddy, brother of Y.S. Rajashekar Reddy, Chief Minister of Andhra Pradesh. Interestingly,

the mine continues to operate even though its 20-year lease, granted on August 4, 1985, has expired. Under normal conditions, the average level of production is 690 tonnes per year.

From a mining engineer who agreed to show me around the mine and ore processing areas, I learned that the workings were quite extensive – covering nearly 200 hectares. He seemed unconcerned that the lease had expired 3 years ago: “They are in the process of acquiring a fresh one,” he told me. Until the new lease could be obtained mining activity was to be slowed and limited to selected tunnels. Apparently, the mining capacity had been reduced to around one tonne per day.

It turned out that around 100 people worked in the Saraswathi mine and milling units. All those working underground at the time of my visit were migrants from the Katni District of Madhya Pradesh. There were around 30 people working inside the mine at the time. Every year, fresh migrants arrive to work for some time in the mines and ore crushing mills. These workers hail from places like Bihar, Uttar Pradesh, etc.

I was surprised to be allowed inside the mine workings. Nevertheless, it was made clear that I should not take any pictures; to ensure that I didn’t, a foreman was summoned to escort me below ground. I gathered that the prohibition on photography was because the mineworkers were not supplied with any safety wear, such as helmets. In spite of this, I did manage a few shots.

I followed the foreman into the mine; in no time the sunlight penetrating the mine entrance could no longer reach us and our small yellow tungsten lights took over. In the gloom it was very difficult to make out the various activities within the mine. Descending further, I noticed tiffen boxes lying around a corner. On enquiring about the tiffens, a young worker confided that the miners took their lunch break inside the mine, since it was much cooler underground (outside the temperature was around 43°). This young person had the task of bringing in water and other required items from the outside whenever the need arose.

An air compressor was constantly pumping air into the mine from outside to maintain a constant supply of air for workers to breathe, notwithstanding the fact that the draft increased the dust level inside the mine.

I saw no evidence of personal protective wear, such as gloves, boots, or masks being worn by the miners; they were simply clothed: shirt, trousers and slippers, with only one I observed wearing a helmet. Most were carrying either picks or mattocks. I discovered that the workers lived near the mine and were paid around 80 rupees (2 dollars) per working day, with no payment for holidays or sickness. There was no medical facility either in the mine or the nearby mine office, apart from the customary first-aid box.



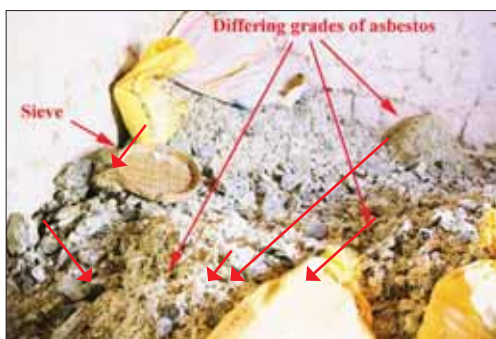


After being hacked from the asbestos-rich seams, the excavated lumps of ore are loaded into trolleys which are hauled from the mine mechanically. The ore is then dumped and allowed to dry out before being taken to the milling unit.

From the health standpoint, the milling of the asbestos ore and grading of fiber appeared to be the worst part of the whole operation. The primary activity inside the milling unit is to separate the asbestos fiber from encasing layers of Dolomite and Serpentine. Women from local villages break away the waste rock using small hammers then separate and grade the fibers manually, using sieves. To my dismay, when I entered the room where this process took place I found it deserted. In fact I could find not a single woman working anywhere in the unit. Questioning this, I was told: "Everyone went to attend the marriage nearby." However, I could see fresh dust all over the place.



"Women from local villages break away the waste rock using small hammers then separate and grade the fibers manually, using sieves."





Even though I was not able to see the grading process, I learned that the asbestos was divided as follows: A special (fibers over 1½ inches), then A (1-1½ inches), B (½-1 inch), and C (¼-½ inch). The grades A special, A and B, were the ones hand-picked by the women; the rest of the ore was crushed by machines operated by male workers to extract the C grade asbestos. Apparently, the best quality asbestos went to Hyderabad Industries and TVS Brakes while the low quality product was packed in sacks to be sent to industries manufacturing corrugated roofing sheets.

An Asbestos-Cement Factory

The State-owned Tamil Nadu Asbestos Sheet Unit, set up with a capital outlay of Rs. 26 million and located at Alangulam, Virudunagar District, commenced commercial production in October 1981; it is a subsidiary of Tamil Nadu Cement (TANSAM). The total capacity of the plant is 36,000 tonnes of asbestos-cement (AC) sheets per annum. It produces corrugated, semi-corrugated and plain



sheets of 1 meter to 3 meters length with a standard width of 1.05 meters and thickness of 6 mm. The range includes plain sheets and accessories.

The asbestos sheet unit achieved 94.50% capacity utilization in 2006-07. Gross sales in 2006-07 were Rs.183.2 million. This unit gives direct employment to 255 people and indirect employment to a further 700. The factory imports virtually all the asbestos it uses, mostly from Canada but also from Zimbabwe (as seen in the picture, below). Enjoying a high reputation in the market, ARASU brand AC sheeting is supplied to Tamil Nadu, Kerala, Pondicherry and parts of Karnataka.

I visited the Alangulam unit on May 3, 2008. Making my way to the area housing the crushing (grinding) mill, I observed that a large number of bags of asbestos were stacked in the vicinity. One operative, wearing no protective mask, had the task of feeding asbestos from the bags into this machine, which splinters the fibers prior to mixing with cement and fly-ash. As I moved through the factory, I noted that none of the workers wore protective gear; dust was to be seen everywhere, but I had no way of assessing how much of this was asbestos or of measuring airborne fiber levels.

During their lunch break the workers sat inside the plant to eat since there was no canteen or any other common area to accommodate them. After lunch, some workers also enjoyed a brief nap inside the plant. It was my impression that the contract workers would be most affected by adverse conditions since they were made to do more work than the permanent workers. There are many unions for the permanent workers but these seem more focused on salary structure than workers' safety and security.

During the production of asbestos sheeting at the unit, around 30% of the output ends up as waste, due to thickness problems, cracks etc; these waste sheets are dumped inside the factory perimeter. On enquiring the reason for stockpiling waste and cracked sheets, I was informed that some were given to needy people to make small shelters in nearby villages free of charge; others were picked up by factory employees, themselves. Some privately owned factories also tend to reuse waste material, unlike the Alangulam unit where no such facility is maintained. One can easily spot a large amount of asbestos sheets spilled all around the factory.

The factory has neither notices informing employees about safety measures nor any training program to instruct them how best to handle dangerous materials like asbestos. One person I spoke to in the factory admitted that he had no idea that asbestos fiber could be harmful. Another – a young contract worker – dismissed the risk saying "I am not going to die immediately, who knows what my future is." The monthly pay of contract workers is around 3000 rupees, a third that of permanent employees, who are well paid for the easier working conditions they enjoy. However, some of the young contract workers accept this disparity in the hope that one day they may be accorded permanent status. In the usual course of events it was necessary to bribe an official or be recommended by someone of standing to get a permanent position.



"During their lunch break the workers sat inside the plant to eat since there was no canteen or any other common area to accommodate them."

POTENTIAL HEALTH HAZARDS OF ASBESTOS CEMENT ROOFING FOR INDIA'S POOR*

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This paper examines the potential health effects of asbestos, particularly asbestos cement roofing, on the lives of the urban poor, comparing perspectives within the global community with that of the Indian Government.

The urban slum of New Lingarajapuram was chosen as illustrative of conditions found in slums throughout India, as the location for a survey. After presenting the context and data obtained in this survey the results are examined and wider issues surrounding asbestos use are discussed.

Asbestos Cement Roofing – Is it Helping or Hindering the Poor?

Asbestos cement (AC) is an attractive roofing option for the poor primarily because it is cheap. This appears to be largely due to government protection of the Indian asbestos industry. AC roofing is also durable and strong which, when combined with its resistance to flammability, makes it an attractive proposition; all the more so for government authorities throughout the nation attempting to deal with the numerous and pressing issues of the poor, of which housing is merely one aspect.

It is common practice in both rural and urban areas for those living under thatched leaf roofing to replace this with corrugated AC when they can afford it. The difficulty associated with making a thatched house fully secure is a significant reason for this. Lockable doors, if affordable, cannot guarantee security requiring a family member to be present at all times in order to guard their property. This has the potential to significantly disrupt family life, employment and schooling. While this issue may be of less concern in remote rural areas, it is more pressing for people living in high-density situations such as those found in the New Lingarajapuram slum. Regardless of the issue of security, however, replacing thatched leaf roofing with corrugated AC is considered to be the “next step up” for those who are poor.

The Case of New Lingarajapuram Slum¹

In September of 1987, Bangalorean State Government officials evicted approximately 2,700 squatter families from their homes at Vasantnagar. This occurred despite several social service organizations lobbying on behalf of the inhabitants, in order that they might be able to stay put and continue to live their lives unimpeded in a place they had occupied and developed for ten to fifteen years. The issue was so contentious that the case ended up being taken to the Supreme Court. Upon receiving a verdict in their favor, Government officials went that same day to Vasantnagar, loaded families onto lorries and relocated them in the middle of the night to a new site now called New Lingarajapuram.

In order to ensure that the squatters did not attempt to return to Vasantnagar, Government officials ordered the demolition of the established places of worship among the original community. Idols from the Catholic Church were removed and impounded, and the local Imam was imprisoned. Back in New Lingarajapuram, families were assured that buses would be provided to enable children to attend their original place of schooling. This never eventuated. However, local Government officials gave each family 300 rupees, a patch of land fifteen by twenty feet, and five sheets of AC roofing. In order to qualify for this package, Government officials photographed people standing outside their houses. An unexpected problem was the fact that unscrupulous people sought to be photographed in front of the homes of others in order to receive land they were not entitled to.

Why was it that the people of Vasantnagar were transferred from one slum only to be put in another? Vasantnagar, a place where its inhabitants had established some degree of normality, social order, access to employment, markets and schooling, was located in downtown Bangalore. Simply, the squatters inhabited land that over the years was becoming increasingly desirable. At the point of eviction, Vasantnagar was prime land in a rapidly growing city with a booming economy and an increasing middle class. Land prices were soaring.

Life in the New Lingarajapuram Slum?

Today, the slum is well established. Tiny streets are jammed packed with the homes and businesses of the inhabitants. Some dwellings are well built, reaching two or three storeys in height. Many however are overcrowded, the occupants living in very primitive conditions, without adequate sanitation or water supplies. Cooking is often carried out inside over an open fire, with little or no outside ventilation. Referred to as “the choice of the poor,” AC roofing panels are a very common sight throughout the slum.³

For the majority of people, living in the slum of New Lingarajapuram means

a daily struggle with issues resulting from the effects of poverty. For the most part, homes are overcrowded and often temporary structures. Floors are generally earthen, with some made from concrete. Houses are often built off the existing walls of adjoining properties. Many households are living in one or two small rooms. The Researcher visited a small one-room house that was occupied by a family of eight. A double bed frame took up a significant amount of space. Each night, four members of the family slept across the top of the bed on plywood sheeting, while the other four slept underneath on mats on the earth floor. Such conditions are common throughout New Lingarajapuram.

Like most people living in slums throughout the world, the inhabitants of New Lingarajapuram cook using either open wood fires, or kerosene burners. Occasionally some would cook using gas. The use of these fuels creates both a significant fire hazard and a substantial health risk to household occupants. Occupants are subjected to considerable amounts of smoke inhalation or fumes from cooking equipment. The cumulative effect of this over a period of years should not be underestimated. Occupants are also at risk of burns and scalds; injuries resulting from living in overcrowded housing, where cooking takes place indoors.

New Lingarajapuram Slum Sample Survey⁴

In order to assess the condition of, and extent to which, AC roofing was a problem for those living in the New Lingarajapuram slum, the Researcher, with the help of an Indian pastor working in the area, undertook a small sample survey of fourteen houses. While the survey is of limited size, it was intended to be indicative of the population diversity found living in New Lingarajapuram. All of the houses visited had AC roofing and an absence of ceilings.

Results of Survey

House Rental versus Ownership

- ◆ Forty-three per cent of houses are rented as opposed to owned by their inhabitants.
- ◆ Rental prices ranged from 250-600 rupees/month (equivalent to US\$5.65-13.57 /month at 44.23:1).
- ◆ Of the six households renting accommodation, only one rented a two-roomed house, the remaining five households living in dwellings with one room.
- ◆ Two households who were renting shifted to New Lingarajapuram in order to take advantage of cheaper rents. For one household, this helped the family survive when casual employment became scarce.
- ◆ Two households who owned their properties rented out part of their homes. One lived in a two storey, four-roomed house, having built on top of the AC roof by filling in the corrugations with cement. The downstairs room was rented to a family of four for R250/month, while

ten people sleep above on the “filled in” AC roof.

Total Occupants per Household

- ◆ The highest number of occupants living in one house was 12.
- ◆ Two houses surveyed had five children (less than 15 years of age) living there, with one of these houses being of one room in size.

Number of Rooms per House

- ◆ Fifty per cent of houses surveyed were one-roomed dwellings.
- ◆ Just over one-third of houses surveyed contained three rooms. One of these houses contained four rooms, but had rented one of these out to another family.
- ◆ It should be noted that in all houses surveyed, all rooms are multi-purpose, being areas for cooking, eating, sleeping, etc.

Length of Occupancy in Years

- ◆ The longest any sample household had been renting was four years.
- ◆ Half of all sample households had lived in New Lingarajapuram for six years or more, emphasizing the relative stability of the population.
- ◆ Of the 36 per cent of households who had lived in New Lingarajapuram for 16 years or more, 40 per cent had lived in the slum since its inception.

Method of Cooking

- ◆ Thirty-six per cent of households use kerosene as their only fuel for cooking.
- ◆ Fifty per cent of households use wood as either their main source of cooking fuel, or in combination with kerosene or gas.
- ◆ Of those households exclusively cooking with wood fires, one said they only did so outside.
- ◆ Of the 14 households surveyed, four roofs were painted on the underside, three of them less than one year before surveying. Regardless of cooking fuel used, three of these houses had roofs that were discolored to varying degrees. The fourth household cooked using gas in a separate kitchen with a high cement ceiling.
- ◆ Of the ten households that had unpainted AC roofs, all of them were discolored quite badly, with four roofs in extremely poor condition.

Household Ventilation

- ◆ Eighty-six per cent of households had either poor or no ventilation aside from their entrance doorway.
- ◆ Of the 14 households surveyed, only 14 per cent had ventilation that could be described as adequate for cooking purposes. This is usually in the form of one or more windows (generally unglazed), of approximately 200mm x 380mm in size.

*This paper is based on *Health, Poverty and Trade Issues in Low Cost Housing Policy: the Use of Asbestos Cement Roofing in Indian Urban Slums*, a research study submitted by the author in partial fulfillment of a Master of Arts degree in August 2006.

Photographs of New Lingarajapuram Slum



Typical AC roofing in New Lingarajapuram, Bangalore. Note lack of ventilation apart from that available by using the doorway.



Flaking and pitted AC roofing, resulting from smoke damage. House was newly built and had been occupied for one year at the time of survey.



Smoke damaged and cracked AC roofing (same dwelling as above).



Typical exterior condition of AC roofing in New Lingarajapuram. Note the broken AC roofing sheets, low roof height and the ventilation 'window' – a typical size in the homes of New Lingarajapuram.



The effects of cooking over an open wood fire indoors. Note the ventilation 'window,' and the condition of the smoke blackened walls and AC ceiling. The occupants have lived in this dwelling for 16 years.



Pitting and smoke damage on AC roofing after long-term use (same dwelling as above).



Charred and cracked AC roofing after long-term use (same dwelling as above).



Homemade skylight cut into AC roofing, the cutting of which releases harmful chrysotile fibres into the environment. The roof has been previously painted with white emulsion paint which deteriorates rapidly, often showing signs of discolouration and mould. Note the contrast in ceiling colour when compared to white ceiling fan (top right).



Exterior AC roofing in reasonable condition. Note surface weathering.



Typical display of corrugated AC roofing for Sale, Kothanur, Greater Bangalore (Reesearcher, Supplier Survey, February 3rd, 2006).

Kothanur Product Price and Supplier Sample Survey

During a visit to Kothanur, a rapidly growing suburban area about 13 kilometers outside of Bangalore, the Researcher conducted a small sample survey of roofing suppliers operating in the area.⁵ The area is undergoing a building boom, resulting in the presence of many retailers within a relatively small area. It is reasonable to suggest that the findings of this sample survey would be fairly typical of retailers selling similar products elsewhere in Bangalore. In visits to six retailers of AC roofing sheets, the following information was obtained:

Description of Products

Product Retailer One

As well as selling tiles and sanitary ware, the retailer sells "top quality" AC corrugated roofing (ISI Ramco) manufactured in Karnataka and Tamil Nadu. Installation of the product requires drilling holes in the roofing. The retailer was unaware that the product contained asbestos, thinking it was a composite of cement and paper.

Product Retailer Two

Retailer sold both AC corrugated roofing and corrugated iron, the latter in Heavy Strength (H/S) or Light Strength (L/S). The retailer explained that AC roofing is safe and causes no health problems. The retailer added that the only problem with the product can be a tendency for mould to grow on panels if they are not painted, a procedure they would recommend. An advantage of AC roofing is its strength, enabling it to be walked upon. The product is installed by drilling holes in the AC roofing in order for a U or J-bolt to be attached to the metal piping that forms the roof support.

Product Retailer Three

Retailer sold AC roofing as well as cement and granite aggregate. The yard was under the supervision of a young boy who telephoned his father for product prices. The boy's knowledge was understandably limited, so no further information was gained.

Product Retailer Four

Supplied product prices only.

Product Retailer Five

The retailer manufactured various fiberglass products including roofing panels. The finished product looks similar to pressed clay tiles and requires fixing to a thin metal frame. In order to match the comparison size of 10 feet x 31/2 feet, three fiberglass sections would need to be produced and joined together.

Product Retailer Six

The retailer sold various styles of clay tiles. These appeared to be popular in some areas of Kothanur, the Researcher observing them in-situ at the South Asia Institute for Advanced Christian Studies, and Visthar (an education and retreat centre). Prices were unable to be obtained, but it is reasonable to assume that clay tiles would be considerably more costly than AC roofing.

Price Comparison

Supplier	Roofing product	Size:feet	Cost:rupees	Cost:pounds Sterling R78:1
Retailer One	Corrugated AC	10 x 3 1/2	R310	3.97 (US\$7.01)
		8 x 3 1/2	R255	3.27
		6 x 3 1/2	R210	2.69
Retailer Two	Corrugated AC	10 x 3 1/2	R320	4.10
		8 x 3 1/2	R255	3.27
	Corrugated Iron	10 x 3 1/2 H/S	R480	6.15
		10 x 3 1/2 L/S	R380	4.87
Retailer Three	Corrugated AC	10 x 3 1/2	R310	3.97
		8 x 3 1/2	Unavailable	N/A
Retailer Four	Corrugated AC	10 x 3 1/2	R310	3.97
		8 x 3 1/2	R270	3.46
		6 x 3 1/2	R250	3.21
Retailer Five	Fiberglass	10 x 3 1/2	R2,450	31.41

Observations

The prices between competitors selling AC roofing are very similar.

The difference in price between AC roofing and fiberglass is extremely large with the equivalent of a 35 square foot panel costing nearly eight times as much as AC roofing. Interestingly however, while the cost of zinc coated corrugated iron is higher than that of AC roofing, the difference is more realistic (one and a half times more for heavy strength corrugated iron). That said, a price difference of this magnitude may be too great for the majority of homeowners, a factor that may at least partially account for its relative absence throughout the area. It is expected that, like fiberglass, the cost of clay tiles would be prohibitively expensive for the majority of homeowners.

Discussion

Asbestos Cement is viewed by some in the developing world as the ideal answer to the problems associated with the provision of shelter, especially in low cost and slum contexts. However, the use of AC roofing throughout India is problematic. Of central importance is whether the use of AC in slum and low cost housing results in the environmental exposure of occupants to chrysotile asbestos. Generally, AC roofing has been regarded as posing no threat to occupant health provided the panels are well-maintained.⁶ However, as seen in the survey, the condition of AC roofing in the New Lingarajapuram slum is poor. What impact does smoke damage have on the integrity of the product? Does the fact of damage caused by bumps and scrapes have any adverse effect on occupant health? Is the presence of cracked and broken panels indicative of the release of harmful chrysotile fibers into the household environment? Are these issues exacerbated by the degree of overcrowding and the lack of ventilation found in most dwellings surveyed in the New Lingarajapuram slum? As Rahman et al. conclude, "More information is urgently needed

Government authorities supplied essential materials for the provision of shelter to people who would otherwise have nothing. However, the health risks associated with the supply and use of AC products should also be cause for concern. Is the Indian Government supporting an industry whose products have the potential to cause large-scale health problems in the future? If so, it hinders rather than aids the development of India's most vulnerable citizens.

Chrysotile and Asbestos Cement – What's the Problem?

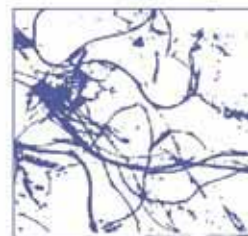
The only type of asbestos traded internationally is chrysotile. "About 90% of global asbestos use today is in AC construction materials, mainly flat sheet corrugated roofing panels and pipes."⁸ However, like other forms of asbestos, chrysotile-based products present a significant health hazard. Chrysotile is carcinogenic. "Single fibres can cause cancerous conditions five to 30 years after exposure."⁹ A study undertaken by the Cancer Research Institute, Chennai, concluded that three to four per cent of all lung cancer in India is asbestos-related.¹⁰

Given that chrysotile asbestos has been proven to be carcinogenic, the issue of fiber liberation from AC products in India is of concern. Not only are thousands of asbestos workers exposed to such problems, hundreds of thousands of workers in downstream industries, like construc-

about the extent of hazards represented by these products as they age and weather."⁷

Associated with this problem is how governments in the developing world should respond to those citizens in need of shelter, yet having limited or no resources. As with all people throughout the world, the citizens of India deserve the provision of basic human requirements, one of which is access to adequate shelter. In providing sheets of AC roofing to those people resettled in New Lingarajapuram,

Chrysotile Asbestos – Fibre Length and Shape



Curly Chrysotile Fibres, magnification x 1400 (OEDA, 2000:2).



Straight Chrysotile Fibres in AC, magnification x 6500 (OEDA, 2002:2).

A key issue in the debate surrounding the carcinogenic potential of chrysotile centers on the issue of fiber length and shape. Short fibers are thought to penetrate the human body less than fibers that are long. Regarded as less hazardous in terms of ingestion than straight fibers, it has been claimed by pro-asbestos proponents that curly fibers are too curly to penetrate into lung tissue (OEDA, 2006). However, further studies have revealed that chrysotile fibers can be both long and straight, as evidenced above. Added to that, other studies have revealed that short fibers are able to penetrate more deeply into the lungs, therefore causing greater problems than first thought (Suzuki, GAC, 2004:27). Regardless, the length and relative dimensions of chrysotile fibers has been found to differ in AC roofing (Dyczek, 2004:8).

Asbestos Cement - Friability

Product friability can be a significant indicator when assessing the potential for environmental exposure to chrysotile fibers from AC roofing. When not maintained in "perfect condition" AC roofing can release fibers (Vogel, European Trade Union Institute researcher, personal communication, May 31, 2006). Chrysotile fibers have been found in debris washed by rain or high pressure water jets from AC roofing in poor condition (OEDA, 2006). The condition of AC roofing is certainly an important influence on the friability of the product. Greenberg writes, "In the fresh state I have teased out the odd bundle of fibers with my thumb nail, but with well-weathered material, it has been possible to disintegrate it further manually" (personal communication, May 31, 2006).

tion, are as well. Those who work with the product, installing, cutting and disposing of it are exposed to harmful asbestos fibers. Added to that are the hundreds of thousands of end-users that are exposed to AC products on a daily basis in their homes, schools and workplaces. If products like AC roofing are regularly monitored and kept in good condition, the threat they pose to end-users is reduced. If this is not the case, however, the prevailing scientific and medical opinion is that it should be removed and disposed of; a difficult and complex job requiring specialist expertise and large expense.¹¹

Research Findings

Despite a lack of resources precluding an exhaustive investigation of the issues raised in this study, and the fact that practicalities prevent the provision of much of the corroborating evidence in this chapter, the findings of this study provide indicative support for the following hypotheses:

1 Exposed and damaged AC roofing exposes slum dwellers to adverse health effects caused by the inhalation of chrysotile fibers. This can result in debilitating illnesses, prolonged suffering and death.

AC has been proven to be friable, increasing the possibility of it releasing harmful chrysotile fibers. Added to that, AC roofing becomes increasingly brittle with age, regardless of how well it is maintained. The subsequent exposure to asbestos fibers has the potential to affect the thousands of occupants living in the New Lingarajapuram slum, as well as the millions of people living in similar conditions throughout India. The AC roofing assessed during the New Lingarajapuram Sample Survey was generally in poor condition and continuing to deteriorate, therefore increasing the likelihood that harmful chrysotile fibers

will be released into the surrounding environment. Dopp et al. write, "Indoor air can become contaminated with fibers released from building materials, especially if they are damaged or crumbling."¹² Added to that, if acid rain is, or became, a problem in the rapidly expanding and heavily polluted city of Bangalore, this would further threaten the durability of AC roofing and subsequently increase the potential for release of chrysotile fibers.¹³

2 Cooking indoors over wood fires damages AC roofing, increasing the

likelihood of potentially harmful chrysotile fibers being released into the surrounding environment, thus threatening the health of the occupants.

It is probable that smoke and heat cause most damage to the underside of AC roofing in slum contexts. This is a consequence of cooking inside over open fires in small dwellings generally having little or no ventilation (see photographs). Visits to various dwellings in the New Lingarajapuram slum as part of the Site Survey revealed that the vast majority of AC roofing was in poor condition. Over time, the crusting of smoke soot on the underside of the roof solidifies and eventually flakes off, appearing to pit and damage the AC. This increases the likelihood that harmful chrysotile fibers are released into the surrounding environment. In addition, the survey found many AC panels that had been cracked or broken. It is possible that this premature deterioration has been caused by both smoke and heat damage. Exposure to such elements is likely to make the product increasingly brittle and consequently more friable. Added to that is the fact that when AC roofing is cracked or broken, harmful chrysotile fibers are released in significant numbers due to the pull out effect as discussed by Dyczek.¹⁴ Importantly, the lack of ventilation prevalent in most dwellings means that any chrysotile fibers released as a result of damaged roofing are largely trapped inside the dwelling, thereby increasing the chance of occupant exposure and inhalation. The fact that most dwellings are small and overcrowded further exacerbates the potential of this problem.

The Researcher notes that where cook-

ing had been conducted indoors over kerosene in New Lingarajapuram, the AC roofing was still in a state of deterioration. Even those roofs that had been painted on the underside had become discolored, with a cracked panel being evident in one dwelling. It is unknown just how much of an adverse effect the indoor use of kerosene cookers has on AC roofing. This is an area that may warrant further investigation.

3 The inevitable bumps and scrapes to AC roofing, a consequence of living in small and overcrowded slum dwellings often with very low ceilings, will result in the release of harmful chrysotile fibers into the surrounding environment, thus threatening the health of the occupants.

The friability of AC roofing has been clearly established. This process inevitably speeds up when panels are already in a state of deterioration, as found in the vast majority of dwellings throughout New Lingarajapuram. In contrast to the majority of houses throughout the developed world, e.g. in Australia, New Zealand and the United Kingdom, all houses sampled had no ceiling beneath the underside of the AC roofing. Thus, chrysotile fibers are released directly into the living space. In a context like the New Lingarajapuram slum, both the prevalence of overcrowding and size of dwelling combine to increase the chance that exposed AC roofing will get damaged or scraped as a result of the activities of the occupants. The low roof height of many dwellings further exacerbates this likelihood. Added to that, the lack of ventilation effectively traps released chrysotile fibers within the dwelling.



What about damaged AC Sheets?

The risk of asbestos dust release from AC products subjected to breaking, cracking or spilling is high. Studying the risk of asbestos release based on analysis of AC roofing sheets in Poland, Dyczek makes the following observations:

- The asbestos fibres are sticking out due to the pull out effect. This occurs when composite materials that are reinforced by short fibers are fractured or cracked, as in the case of AC (2004:8).
- The fibres observed differed in both length and relative dimensions. "Any mechanical influence on these protruding fibres may produce a large number of asbestos dust particles" (ibid.).
- "From one asbestos fibre, protruding as we see in Photo 12 [sic], we may get hundreds or thousands of respirable asbestos fibres; it is only a question of even feeble mechanical action or other tension. For example, movement caused by thermal expansion could be sufficient" (ibid.).



Asbestos Fibres on a Broken AC Sheet. SEM magnification 200x (Dyczek, 2004:8).

4 Those living in slum contexts similar to New Lingarajapuram are least equipped to deal with the potential health issues arising from exposure to AC roofing.

People living in slums like New Lingarajapuram face a daily struggle for survival. The reality of poverty confronts this sector of society in ways few other people experience. While New Lingarajapuram displays occasional signs to the contrary, the vast majority of occupants struggle to achieve the most basic level of subsistence. Issues common to most people enduring extreme poverty are prevalent within the slum: lack of food, malnutrition, diseases associated with inadequate water and sanitation facilities, little access to health care, indebtedness to moneylenders and landlords, and un and under-employment. These issues result in an existence marked by insecurity, vulnerability and uncertainty.

As displayed in the New Lingarajapuram slum, those facing the reality of poverty lack the resources required to address their situation. The reality is that people living in New Lingarajapuram have many things to worry about other than the potential health risk caused by living under AC roofing. Added to that, there is a general lack of knowledge concerning the carcinogenic potential of chrysotile-based products throughout most sectors of Indian society, including consumers, retailers and policy-makers.¹⁵ This may even extend to some within the medical sector: "I reckon that the actual carcinogenic fibre of asbestos probably does not exist here in contrast to that which exists in Belfast, UK..."¹⁶

Given the lack of knowledge and confusion about chrysotile throughout India, the poor are least likely to be informed about such issues. However, even if this were not the case, the poor are generally least equipped to be able to mobilize as a group in order to articulate their concerns. This means that they are least likely to be heard and responded to in ways appropriate to their situation, making it almost impossible for them to change their reality. Policy-makers are unlikely to listen to the concerns of the poor unless they are forced to do so, or others intervene on their behalf. The pervasiveness of the caste system within India further exacerbates this problem.

5 The promotion and use of AC has significant disadvantages for the developing nation of India, outweighing any advantages to be gained from use of the product.

The reasons for this are as follows:

a) Although encouraging economic growth and prosperity, the support given to the AC industry by the Indian Government has the potential to create large and complex problems:

While the industry provides a sig-

nificant engine of growth, providing revenue and employment, costs resulting from the adverse effects of AC products have the potential to far outweigh any gains the industry may bring to the Indian economy. While providing shelter to those in need at an affordable price, product friability means that the potential for adverse health effects, resulting from environmental exposure to AC roofing, is likely to be high. Further research and survey data would reveal the actual extent of this problem. However, asbestos-related diseases resulting from exposure to chrysotile fibers have very long latency periods, generally ranging from 10-40 years. Even among the relatively stable population in New Lingarajapuram, symptoms may not be observable for some years yet. Diagnosis of such diseases can prove to be difficult. Due to a lack of accurate data concerning those suffering from, or at risk of, asbestos-related diseases in India, the country is dealing with a potentially large problem with significant and far-reaching consequences, yet it is doing so from the basis of relative ignorance.¹⁷ Even if the proportion of those suffering from such diseases in India was low, the actual numbers affected could be large. The subsequent social and financial commitment required by State and/or Federal Government to address these issues has the potential to divert attention and funding from other development priorities.

b) The promotion and use of AC roofing has potentially large and unknown costs for India, both in social and financial terms:

Diseases resulting from exposure to chrysotile can be fatal or seriously debilitating. Often victims may be the only breadwinners, leaving dependents facing a precarious and uncertain future. This is exacerbated for those families in debt and/or living in rented accommodation, both common realities for the poor. The threat to both social and economic cohesion within communities is obvious and potentially far-reaching.

c) The promotion and use of AC products within India is a threat to child health:

It is probable that if exposed to asbestos, children will have an increased susceptibility to asbestos-related diseases due to the fact that their bodies are still developing. "Young body tissue is growing and may be more susceptible to carcinogens."¹⁸ "Because of the rapid increase of risk with time, the lifetime effect of exposure in childhood is likely to be much greater than if exposure begins in adulthood."¹⁹ "Asbestos has been found in the lungs of very young children (three weeks-25 months) when examined after they had died."²⁰ In a context like New Lingarajapuram, where children are living in overcrowded and poorly ventilated environments under increasingly

friable AC roofing, the threat to child health is likely to be high.

d) The promotion and use of AC products creates an obvious and proven threat to worker safety and health:

This is evidenced in the adverse impact on worker health resulting from exposure to asbestos during mining and manufacture.²¹ It is also evidenced in the experiences of those working in the Indian ship-breaking industry, where large amounts of asbestos are required to be disposed of by workers operating in dangerous and unprotected conditions.

e) The promotion and use of AC products results in significant environmental degradation both within and beyond India:

Industries involved in the mining of asbestos have dumped asbestos waste in ways that are adverse to environmental sustainability.²² The cost to present and future generations is high. Such practices threaten those living near mines and dumping sites. "Because of their small size, chrysotile fibers may be transported from their place of origin by wind and water."²³ The dumping of asbestos waste also adversely alters the ecology of the surrounding plant and animal life.²⁴ In the case of those involved in India's ship-breaking industry, asbestos waste has been reported to have been dumped in the sea. Such behavior has a significant impact on the seawater environment.

f) The promotion and use of AC products encourages the presence of toxic businesses in India:

Businesses focused on increasing profitability can be tempted to adopt substandard and unethical practices. This includes operating in settings where regulations concerning wage rates, worker health and safety, and environmental protection are non-existent, lax or unenforced. Worldwide, the asbestos industry has a history and reputation for operating in such a manner.²⁵ Industry observers have for some years documented the migration of toxic industries, including the asbestos industry, from countries in the developed world to developing countries eager to generate economic growth and prosperity. The migration to, and subsequent growth of, the asbestos industry within developing nations like India, is significant and mirrors the migration of other such industries with similar adverse health effects, e.g. the tobacco industry.²⁶ In this regard, the costs resulting from the presence of such industries outweigh any benefits that might be gained from their activities.

g) The promotion and use of AC products has the potential to expose the Indian asbestos industry to future litigation, by claimants seeking compensation for asbestos-related diseases incurred as a result of occupational and environmental exposure:

Companies in the developed world that have previously mined, manufactured or used asbestos-based products, such as James Hardie, Turner and Newall, Halliburton etc, have been subjected to extensive litigation in recent years.²⁷ Regardless of the legitimacy of these claims, the experience of countries like the United States demonstrates that this is an extremely costly business, tying up sections of the judicial system for years.²⁸ Many companies facing such claims file for bankruptcy, although some do so purely to avoid paying huge amounts of compensation, e.g. Halliburton and Owens-Corning.²⁹ Others try to avoid their legal and moral responsibilities through relocation, as exemplified by the move of the parent company of James Hardie to the Netherlands, "... a country that does not have a treaty for the enforcement of a legal decision taken in Australia ..."³⁰

Of particular interest to this study is the fact that environmental exposures are increasingly being recognized as worthy of compensation in case law.³¹ This could have enormous implications for a country such as India, where the use of AC roofing is so widespread. Also of importance is the fact that there is increasing reliance on the State to pay for compensation and health care, when companies default.³² In consequence, this diverts significant funds from other important social issues, stalling the development and growth of the affected country.

The extent and success of asbestos litigation is likely to vary greatly between countries in the developed and developing world. However, in the developing nation of India, litigation against the asbestos industry has resulted in compensation for workers who have contracted asbestos-related diseases.³³ While the current numbers of claims and workers benefiting from compensation are very low, this may change in future years resulting in great cost to the Indian asbestos industry and/or Government.

h) The promotion and use of AC products throughout India presents substantial problems in the event of disaster:

Disaster events demolish houses, schools and businesses, a fact dramatically evidenced throughout much of Tamil Nadu in the tsunami of December 2004. The evidence is clear that broken AC roofing releases significant amounts of chrysotile fiber into the environment. Disaster events of such magnitude could result in substantial exposure to chrysotile, subsequently increasing the potential for adverse health effects. This has far-reaching implications for both survivors and rescue workers alike.³⁴ Added to that, is the prevalence of asbestos-laden debris resulting from a disaster event. Such debris needs to be carefully disposed of in designated dumping sites, something that is

unlikely to happen in urgent clean-up operations where lives and livelihoods are at stake. The adverse effect on the surrounding environment from asbestos-laden debris is also high.³⁵

i) The promotion and use of AC products within India risks polarizing international opinion, impacting negatively on India's image:

Many developed and developing countries have banned the use of all forms of asbestos. The approach of India could send a message to other countries that the nation is unconcerned about human rights and environmental issues. This could have an adverse effect on India's credibility, and its desire to become more prosperous and play a more significant role within an increasingly globalized world. For this reason, it is important that policy-makers, and potential investors in the industry, are fully apprised of the issues surrounding continued asbestos use.

Implications of this Study for Government Policy and Future Action

The problems associated with the continued use of AC roofing throughout India are preventable. As such, the Indian Government is faced with a choice as to how best to respond to those issues surrounding the continued use of AC. A considered response is required in order to prevent ill-considered and hasty ad hoc reactions that could adversely affect the development of the poor. Central to this decision is whether the advantages of continued use outweigh the disadvantages. If this proves to be the case, the status quo can be adhered to. If not, however, some form of action is required, the extent and priority of which needs to be determined given those other development issues currently demanding attention throughout India.

So What are the Alternatives?

Possible responses by State and Federal Government include the following alternatives:

1 Ban the import of chrysotile and manufacture of chrysotile products, as many other developed and developing countries have done.

2 Remove and replace AC roofing in slums like New Lingarajapuram. This would be a difficult and costly exercise, the scale of which makes this goal virtually impossible to achieve. If such a policy was to be pursued, however, at whose expense should this be? Government funding would need to be diverted from other development initiatives aimed at alleviating the plight of India's poor. Those living in slums are least well placed to be able to meet the costs of conversion. Landlords would be likely to increase rental prices in order to recover their costs, further marginalizing those dependent on rental accommodation. Furthermore, the removal and disposal of AC roofing requires highly equipped, specialist teams. Finally, even if AC roofing were to be replaced, what gains could occupants expect as a result?

AC Roofing – Options and Alternatives

Some possibilities include:

Thatched roofing from coconut leaves or similar: As has been used in Visthar, an education and retreat centre near Bangalore, which has adopted environmentally sustainable building practices (Selvaraj, Director of Visthar, personal communication and site visit, February 1, 2006.).

Galvanized corrugated iron: This option has the disadvantage of releasing heat into those dwellings without a ceiling. It would also be noisy during the wet season. However, it would be possible to safely harvest rainwater for drinking from this product and it is relatively cost competitive.

Clay tiles

Fiberglass

Pressed metal tiles (NEDLAC, 2002:66).

Bitumen based corrugated roofing: A short-term solution as seen in Internally Displaced Persons camps resulting from the 2004 tsunami in Tamil Nadu. The product also has a high degree of flammability (Site visit, January 22, 2006).

Cellulose fiber-cement: eg: sisal fiber corrugated roofing (NEDLAC, 2002:62:

Dhillon, The Tribune, May 9, 2002: Online).

Micro-concrete roofing tiles: A durable product using low-cost technology that is easily transferable to developing country situations and initiatives (Ruskulis, 1996).

Refurbish existing AC roofing with an encapsulation process: An option promoted in the developed world, this eliminates the need to dispose of existing AC roofing (Aranovus, April 5, 2006 and March 17, 2005).

NB. Further investigation into the relative merits of these and other options is required.

3 Leave AC roofing in good condition in situ, implementing regular monitoring in accordance with dominant medical and scientific opinion. This would be a complicated and costly task. Added to that, the condition of AC roofing present in other settings, such as businesses, schools, and rural dwellings, also requires regular monitoring – again an expensive proposition.

4 Strengthen the regulatory system to ensure the controlled use of all chrysotile-containing materials.³⁶

5 Ensure that appropriate work practices are maintained for those working with AC roofing.

6 Create a national database registering victims, and those most at risk, of asbestos-related diseases. Added to this, detailing deaths caused by asbestos-related diseases in mortality statistics would further enable the accurate monitoring of the asbestos problem within India.

7 Implement an education programme outlining the potential health risks associated with AC roofing. This would be most effective if relevant information was tailored to the needs of specific groups, e.g. slum dwellers with low or no literacy, product workers, retailers, the medical profession, policy-makers, etc.

8 Ensure asbestos producers and manufacturers operating within and outside of India fund research into asbestos-related illnesses and treatment options. This could prove to be cheaper for the industry than the potential and ongoing costs associated with litigation, compensation and health care.

9 Review the current subsidization of the Indian AC industry. The lifting of subsidies would create an environment where alternative roofing options could compete fairly with AC. However, if the Indian Government wanted to

promote substitute options, it could transfer those subsidies currently given to the AC industry to manufacturers of safer alternatives. It could also use those subsidies to assist the AC industry to transfer from asbestos to non-asbestos fiber-cement production, as has been done in Lithuania and South Africa.³⁷

10 Investigate the viability of alternative roofing options, providing assistance with research and development for manufacturers (see inset).

Should the Indian Government take remedial action in response to the issues raised by the asbestos debate, the latter options (numbers 4-10) could provide useful and cost effective interim solutions while further research is undertaken.

Consequences and Implications of Continued Use of AC in India

India faces many difficulties should negative health effects manifest themselves as a result of environmental exposure to chrysotile asbestos in AC roofing. The experience of many countries is that the consequences of asbestos exposure are far-reaching and costly, both socially and economically.

At the centre of this study have been the people of New Lingarajapuram slum, who live in homes with AC roofing and, occasionally, walls. The people within this community are representative of the millions living in India, and other countries in the developing world, using AC for the provision of shelter. Is the use of AC roofing throughout and beyond New Lingarajapuram killing the very people it was designed to protect? In order to consider the issues raised in this study, it is necessary to further investigate how much of a problem asbestos-related diseases are in New Lingarajapuram and beyond. This will not be an easy exercise due to difficulties in diagnosis and the length of latency before asbestos-related diseases are able to be identified.

India is keen to develop a stable and growing economy so that all of its citizens might prosper. In doing so, however, they risk supporting the development of an industry often regarded as toxic, while ignoring or being naive to the effects of doing so. Ignoring the health problems associated with asbestos use has implications for how the Indian Government treats its citizens, especially those who are poor and vulnerable. Having no developed structure of social welfare, the Indian Government will have to decide how to respond to the issues generated by the asbestos debate, given that it faces many pressing demands on its resources.





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“If the conditions prevailing in India were to be transferred to Europe, there would almost certainly be instantaneous revolution.”

Richard A. Wells (T&N director), Notes on a Visit to Hindustan Ferodo, October 20/24, 1982.

In what remains of the world’s asbestos industry, it is an article of faith that asbestos under “controlled” conditions is safe. This argument is still being used to promote asbestos manufacture and usage in India. Supporters of the “magic mineral” give the impression that asbestos, particularly chrysotile, is almost benign and that not to utilize its many advantages would be almost a crime in itself.

In these contemporary debates, it is often forgotten that India already has over seventy years’ experience in manufacturing asbestos. Ever since the multinational asbestos industry saw India as an important market in the early twentieth century, an asbestos industry has existed in India. Not surprisingly, the country also has the experience of dealing with the occupational disease fallout from its involvement with asbestos. The history of asbestos in India is not a comforting one.

India was once part of the British Empire, so it was logical that Britain – an early pioneer in the production of asbestos – should lead the way in India. British involvement began in the 1920s, when a company specializing in asbestos-cement, Bell’s United Asbestos, set up a marketing agency in Bombay (Mumbai) for imported asbestos-cement sheets. That company was soon taken over by Turner & Newall (T&N), the leading British asbestos conglomerate. T&N decided to begin production in India by building an asbestos-cement factory at Kymore in Madhya Pradesh (formerly the Central Provinces). The company, part-owned by Indian interests, was registered as Asbestos Cement (India) Ltd. in 1934.

Evading Indian tariffs was one of the key reasons for the move, though the potential Indian market for building materials was an obvious attraction. T&N’s output, mostly construction materials such as roofing sheets, competed against locally-made clay tiles and so the factory initially made slow progress. However, a second sheeting factory was built at Mulund (Mumbai) in 1937, which became the company’s head office in India. A third factory was established the following year at Garden Reach, Calcutta. In 1953, a fourth factory was opened at Podanur, Coimbatore District, in Tamil Nadu. The group’s brand name in India was “Everest.”

The management of AC (India) Ltd. had Colonial sentiments. A company brochure, published in about 1949, related how the company “looked to the simple unsophisticated peasantry” for its labor force. Having recruited these “likeable and unspoiled people,” it then returned the favor

by providing housing, education, and co-operative societies. However, T&N’s concerns did not extend to protecting them fully from the risks of asbestosis, which in 1931 had become the subject of government regulation in the UK. In 1937, a T&N director, Robert Turner, told the Mulund Works director (W.H. Rooksby) that instead of introducing dust control, he should simply rotate his workforce. He added: “I should not issue an instruction on this subject, as once the word gets around that asbestos is a dangerous occupation, it may seriously affect our labor force at some future date.”¹ Turner told Rooksby that the Mumbai factory inspector might soon read the UK Asbestosis Regulations. But Turner believed that should present no problem, because T&N would claim that there was no dust or disease from asbestos-cement manufacture. Thus Mulund would be able to “avoid tiresome regulations and the introduction of dangerous occupation talk.”

Turner proved prescient. At the start of 1938, the Chief Inspector of Factories in Mumbai wrote to the Mulund Works, expressing concern at British government statistics on disease and deaths from asbestos.² Turner responded to Rooksby: “All asbestos fiber dust, whether it arises in a factory or elsewhere, is a danger to lungs, and especially so where the person breathing it has not healthy lungs to start with. I should think the average Indian would be very inclined to suffer from any dust irritation.”³ However, Rooksby was told to “correct” the Factory Inspector’s ideas, by stressing that asbestosis was only a risk in asbestos textiles, not cement. The letter containing this instruction admitted that T&N in the UK had cases on record of asbestos-cement workers suffering from asbestosis. The Indian Inspector was probably reassured, but he had not been told the truth.

The numbers at risk in T&N’s AC group in India grew steadily from about 350 in 1935, to nearly 2,500 by the end of the Second World War, and to over 5,000 in the mid-1960s. After the war, the group was particularly profitable, especially during the 1960s when dividends were regularly over 20 percent. By the 1960s, the group was producing about 180,000 tons of asbestos sheeting and pipes annually.

This expanding market had further potential, which T&N as an expert in a wide range of asbestos products was quick to recognize. After the war, it decided to expand its production facilities in Mumbai. In 1949, it established another company named Asbestos, Magnesia & Friction Materials Ltd. at Sewri, Mumbai. Once production began to expand, in 1956 a new site for the factory was chosen at Ghatkopar, Mumbai, where asbestos textile manufacture was launched. The production of asbestos jointings was added in 1958; woven brake linings in 1960; and molded brakes in 1962. In 1964, a company reorganization brought Hindustan Ferodo into existence. A major expansion programme began with the addition of asbestos millboard and Ferobestos (a resin-coated asbestos cloth). The factory, which employed

over 1,200 workers, was similar to T&N's plant in Rochdale, England, which also had a wide range of asbestos products. T&N had a controlling interest in Mumbai, but Indian shareholders were also involved.

Hindustan Ferodo was profitable, but its formation was badly timed for the company. The 1960s was a decade in which asbestos manufacture came under unprecedented scrutiny, because of the publicity in the West concerning mesothelioma and other asbestos-related diseases. At this time, Harry Hardie was the T&N director charged with responsibility for the company's overseas operations. He was acutely aware that not only T&N's UK factories would be scrutinized, but also those overseas. In 1966, he stated:

"The Indian Factories Act does not contain special regulations comparable with the asbestosis regulations in the UK and this is not a notified disease under the Act. Factory Inspectors in India are well aware of the British regulations, but because conditions in the Works at Ghatkopar are so immeasurably superior to those obtaining in the majority of cotton textile mills in Bombay, we are regarded as a model factory, and arguing from strength, have managed to discourage the Factory Inspectorate from making air analyses inside the Works."⁴

Hardie also stated that the company was still rotating workers if they showed any symptoms of asbestosis. Worryingly, a medical examination of workers using the sprayed asbestos process in 1956 had shown several suffering from asbestosis. But the men had been allowed to continue spraying (partly because they received danger money and could not be offered any alternative well-paid work). As Hardie admitted, "over a period extending beyond ten years, we have created for ourselves a situation which cannot be solved easily." The company belatedly terminated spraying asbestos in 1966.

Despite these problems, T&N was still attracted to the developing world, as a way of offsetting falling sales in Europe and North America.⁵ At a meeting of asbestos industrialists in London in 1971, Bill Raines from the American asbestos giant Johns-Manville and T&N's chairman Ralph Bateman discussed the marketing of asbestos-cement products in developing countries. According to Raines, Bateman had this to say:

"His point is that in many of these countries the life expectancy is so low, as a result of deaths from diseases from impure drinking water, for example, as well as starvation, and inadequate housing, that the question of the very, very, small risk of mesothelioma that may exist in exposure to asbestos in some situations, is totally outweighed by the contribution that asbestos pipe and other products can make to improving the living standards and, indeed, the life expectancy of people in these countries."

Raines thought that this was "an interesting philosophy," though he added: "it has to be expressed rather carefully."⁶

Hardie was still grappling with the problems of T&N's overseas factories in the 1970s. In 1975, the company physician, Dr. Hilton Lewinsohn, was despatched from the UK to assess and report on the Indian situation. Lewinsohn was an

important witness. First, he was an expert in occupational lung diseases; second, although he had to work within the constraints of his profession, he was not afraid to criticize the company. On November 10, 1975, Lewinsohn toured Hindustan Ferodo, which employed about 1800 staff (with 1600 on the shop floor). About 600 men worked in the dustiest operations. He judged that general housekeeping was satisfactory, but in the asbestos textile areas the carding and spinning sections were dusty. No vacuum cleaners were available and no dust counts had ever been taken. Nor was it possible to assess the incidence of asbestos-related disease, because no medical records existed and it was only very recently that the company had introduced medical screening.

The following day, Lewinsohn went to the Mulund Asbestos Cement Works. It employed nearly 800 workers and used chrysotile from Russia, Canada and India. The Russian fiber arrived in dusty hessian bags, which were then recycled for further use in the factory – a practice of which Lewinsohn disapproved. He also disliked the policy of switching workers from the dustiest operations after a year, because "it merely leads to dose-sharing and the scattering of men with brief exposure to areas where under the old system they were lost to follow-up."⁷ Medical monitoring was clearly not the company's strongpoint. Lewinsohn noted that although a few of the workers had been X-rayed annually since 1949, the plates had been lost because no one had bothered to store or trace them. Consequently, he was not able to give figures on the incidence of asbestosis or cancer, especially since workers who left were not followed up. That such diseases existed is implied in Lewinsohn's comments that sections of the factory involved in pipe-making were "dry and very dusty." The fiber-treatment plant was antiquated, with fiber tipped by hand from bags into bins. Vacuum-cleaning was not utilized, even though it was recommended in the UK.

In 1977 and 1978 the Indian asbestos industry organized two conferences at Simla and Bangalore, respectively. The events were under the aegis of the newly-formed Asbestos Information Centre, India, which had been modeled on similar quasi-public relations bodies in the UK. Harry Hardie was invited to provide the keynote address on both occasions. The conference affirmed a commitment to the 2 fibers per cubic centimetre (f/cc) threshold that had been set in



the UK in 1969, even though that threshold was almost obsolete. Moreover, not even T&N could meet such a threshold in India. Three years after Lewinsohn's visits, technologists arrived from T&N's Rochdale factory to assess more accurately the dust conditions in Bombay. Their report was circumspect. Even so, at Hindustan Ferodo asbestos-textiles dust counts up to 15 f/cc were recorded (well over the 2 f/cc threshold that had been introduced in the UK in 1969).⁸ Various textile processes in the factory were judged "uncontrolled" or "unprotected." It was noted that: "The respirators presently in use in India would not be approved for use in the UK and it is questionable whether they serve any useful purpose other than emphasizing that a risk exists." The company tradition was that asbestosis was confined to the old spray process, but little confidence could be placed in this because workers could have left their employment and were not tracked. The T&N cement factories were not much better, with dust problems in the mixing and weighing areas ("fibre weighing is a good example of a poor working procedure"), and the only personal protection was the use of inadequate respirators.

Not surprisingly, workers suffered from asbestos-related diseases. In 1979, a new group medical director, Dr. James T. Allardice, toured the Indian factories and remarked:

"I found one case of asbestosis at Calcutta and one case at Kymore, with a further possible nine cases at Calcutta and the odd one or two elsewhere. This was after reviewing a fair sample of current workers' X-rays in the long-serving, most exposed group ... These findings of minimal disease

are reassuring, but, one should not be complacent, since one cannot be certain about the position of lung cancer and mesothelioma ..."⁹

Such findings made multinational companies like T&N vulnerable to criticism – especially since the media could also cross national boundaries. As Hardie commented in 1981: "the nearer we get to sensible regulations in Western Europe and elsewhere the more hysterical will become the activities of pressure groups, and journalists sympathetic to them, who wish to see asbestos banned." Hardie warned that "anti-asbestos campaigns can erupt in developing countries as easily, and as swiftly, as in the developed countries."¹⁰ He had in mind a recent article published in the British journal, *New Scientist*, in 1981, which had highlighted the "double standards" of the industry, which proclaimed its good intentions in the West yet apparently allowed poor working conditions to flourish unchecked in countries such as India. It was written by the campaigning environmentalist Dr. Barry Castleman. His research associate

Robert Mayes had visited Hindustan Ferodo and, although denied access to the plant, had enlisted the help of a factory worker. The latter described the factory as "not pretty," with the textile areas spewing out dust "like a bus on a road in the dry season." Housekeeping was alleged to be poor, with little warning of the hazards of asbestos, few respirators, and inadequate medical monitoring. Floors were dry-swept and lockers contained both ordinary and works' clothes, thus contaminating the former. T&N issued a rebuttal, but Castleman stood by the investigation.

Within a year of the *New Scientist* exposé, working conditions in T&N's factories in India were seen on British television screens. A searing documentary, "Alice – A Fight for Life," featured, inter alia, the flight of asbestos to the developing world.¹¹ It filmed T&N's factories in Mumbai, where workers and their families lived in dusty asbestos-built compounds next to the factory. It was claimed that one in three T&N workers at one factory had asbestosis. The film focused particularly on Hindustan Ferodo, where asbestos could clearly be seen contaminating the streets and railway tracks around the factory. Worker protection was minimal and dust from the ventilation system was cleaned out by contract laborers, who had no protection from dust and no medical checks. The film cast considerable doubt on T&N's assertion that it applied UK standards to its factories overseas.

A nine-month strike at Hindustan Ferodo in 1982 underlined the poor conditions at the plant. T&N director Richard Wells arrived there in December of that year, armed with a copy of the "Alice" film, which was shown to a "limited audience." Commenting on the strike, Wells stated: "The mass of the workers appeared to be easily led or behaved like sheep." He noted that dust counts were "about" 2 f/cc and that damping fiber had only just been introduced. He criticized the rudimentary face masks and observed that they were worn for psychological reasons.¹²

T&N still owned a majority share in Hindustan Ferodo, but in 1991 it began selling its stock. In 1993, BBC correspondents traveled to see conditions at the factory. Working conditions had steadily improved from the 1970s, but many processes were inherently dusty. One worker stated:

"in the dark you could see lots of dust particles flying and there used to be complaints from other departments about the dust that flew out of the carding department because primarily it was that department ... where the problem arose ... [and] while the machines were in operation the dust would fly and at the moment they were stopped, they would sweep out the dust and collect it to one side, with their hand ... the naked hand. Just be swept up."¹³

John Waite, the BBC correspondent, went inside the factory and found conditions visibly dusty. Workers were routinely X-rayed, but the results remained the property of the management. One Indian chest physician recalled reviewing Hindustan Ferodo films in the late 1980s and found that up to nearly a third had lung damage consistent with asbestos exposure. When he tried to take it up with the company he was told his diagnoses were wrong. It was reported that court action against the company had been totally ineffectual.

In 1994, T&N sold off its remaining stock in Hindustan



Ferodo. The new owners immediately changed its name to Hindustan Composites Ltd. In the 1980s, T&N also wound down its shareholding in its Indian cement factories. In 1990, the Belgian Eternit interests took over and the group became Eternit Everest Ltd.

T&N's experience in India is instructive in the context of present debates about asbestos. First, for most of the twentieth century T&N was easily the most important multinational presence in the Indian asbestos industry. Until the appearance of Johns-Manville and Eternit after the 1970s, T&N seems to have been the only major foreign asbestos player in India. This partly reflected commercial realities that stemmed from the legacy of the British Empire. T&N has now gone, but the company's imprint remains in the existence of Hindustan Composites and the cluster of asbestos cement works in Coimbatore and Mumbai. Second, the T&N experience demonstrates the problems of manufacturing chrysotile asbestos under so-called "controlled

conditions." The document trail relating to T&N's Indian factories is patchy, but it is consistent. It tells a story since the 1930s of dusty conditions, poor hygiene standards, a lack of medical monitoring, and workers suffering from asbestos-related diseases.

Contemporary Indian industrialists will claim that this relates to history and "old" conditions. But T&N's history is not that "old." It must also be remembered that T&N, despite its mixed record in India and elsewhere, was the most sophisticated manufacturer and user of asbestos in the twentieth century – in other words, a company that more than any other knew both the risks and the best way to avoid them. Yet by 1990, that company had decided that asbestos production was no longer profitable or feasible in India (or indeed world-wide). The Indian experience shows why the company reached that conclusion: ultimately asbestos dust cannot be controlled safely.



Who needs X-rays anyway



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Gujarat State is one of most industrialized states in India. The State was created in 1960, but industrialization of the region commenced in the second half of the 19th century with the establishment of a cotton textile mill at Bharuch followed by another at Ahmedabad. Later, Ahmedabad came to be known as the Manchester of India. Oil found in Gujarat in 1948 provided great impetus to industrial development;¹ principally along a strip stretching from Mehsana in the north to Vapi in the South (along the railway line to Mumbai) popularly known as the “Golden Corridor.” The number of working factories rose from 3,647 in 1960 to 10,611 in 1979-80² and over 31,000 in 2005-06. The Golden Corridor accounts for 70% of industries in the organized sector, 57.5% of small-scale units and 66% of all working factories.

Limestone, the main raw material for cement manufacture, is widely available in Gujarat. The coastal belt from Gopnath to Okha is rich in high grade limestone; the first cement plant was established in this belt at Porbandar in 1914. In 1948, Shree Digvijay Cement Co. Ltd. (named after an earlier ruler of Jamnagar State) established a cement manufacturing plant at Sikka in Jamnagar District. In 1963, the company opened another factory* at Ahmedabad to manufacture asbestos cement sheets. Digvijay Cement achieved a major breakthrough in 1975 when it more than doubled its exports to 137,000 tonnes from 54,000 tonnes the previous year. Its exports of asbestos products had also likewise increased, raising aggregate export earnings to over Rs.40 million (\$7.7 million).†

Another major industry where asbestos is widely used is power generation. Asbestos was and still is used as insulation for boilers and furnaces. The power plant in Ahmedabad known as the Ahmedabad Electricity Company was established in 1955. It was a State owned company till 1998 when it was sold to the Torrent group of companies.

Ship-breaking is a further source of asbestos exposure for Gujarat workers. In 1978, the Government of India recognized ship-breaking as an “industry” and the Ship Breaking Development Fund was created. Initially, a yard was established at Sachana near Jamnagar, but in 1982-83, Alang,

near Bhavanagar was selected to be developed as a major ship-breaking facility and by June 1983, 12 ships had arrived there for breaking.³ The number of ships increased year on year, reaching a peak in 2001 with more than 330 ships being processed.

Gujarat being a state where chemical, petrochemical, refinery, fertilizer, pharmaceutical, paint, rubber, plastic, dyes & pigments, pesticides, cement, soda ash, and ceramic manufacturing grew in a big way, generated a huge market for insulation and safety equipment. Asbestos gaskets, rope, gloves and blankets were always in high demand, with vendors either manufacturing these latter items on their own premises or outsourcing the sewing work.

Industrialization brought with it a large increase in the number of motor vehicles manufactured in Gujarat. This created a huge demand for asbestos brake linings, largely satisfied by small entrepreneurs manufacturing these and other auto parts – another source of asbestos exposure.

In 1990, I was part of a team making a film on the status of Occupational Health and Safety (OHS) in Gujarat. Interviewing the Chief Inspector of Factories, I was told, off the record of course, that he thought that the workers in Gujarat were immune to asbestos. “Had it not been so, large numbers of workers in Gujarat would have died of asbestos looking at the poor work conditions in Gujarat,” he added. If a senior officer, responsible for protecting workers health had such beliefs, what could be expected of OHS in Gujarat?

Government Concern for Asbestos Hazards

The Government of India resolved in 1981 to constitute a panel on the asbestos products industry. During the 6th meeting of this panel held at Madras (now known as Chennai) the Ministry of Environment and Forests (MoEF) was requested to set up a committee to study “Health Hazards in Asbestos Industry”. The duly constituted committee was chaired by Mr. D.K. Biswas and included members from government agencies and industry as well as independent experts. The Committee met for the first time in February 1984 and two separate study teams were formed. One of the teams was to study the health problems associated

* Throughout this article “Digvijay factory” refers to the Ahmedabad plant (picture right); for convenience Shree Digvijay Cement Co. Ltd. will be referred to as “Digvijay Cement.”

† Around \$7.7 million in 1975 but \$1 million at the current exchange rate. Further dollar conversions also use historical exchange rates.



with asbestos exposure (the A-team) and the other was to study the existing legal framework (the B-team). There were six industry representatives in the A-team, out of a total of 14 members. The Committee Secretary was none other than Brigadier Kapoor, Executive Director of the Asbestos Information Centre, Delhi.

The Committee submitted its report on July 9, 1985 – the day on which the Indian Association of Occupational Health was established and which is celebrated by its branches as Occupational Health Day. In his preamble to the report of the A-team, Chairman Dr. B. B. Chatterjee, noted: “we believe that we have to learn to live with asbestos; a substance that is going to be with us for a long time to come.” He went on to concede: “...the team was conscious of the absence of suitable epidemiological studies in this country on asbestos related problems. Sufficient expertise and manpower required for evaluation of the workplaces and timely and accurate diagnosis of asbestos-related diseases do not seem to be available to meet the requirement in the country...”⁴

Also in the A-team report was the observation: “...only some cross sectional studies of certain factories in India have been carried out, which are exploratory in nature. They served the purpose of bringing awareness in the industry and persuading all concerned to take effective measurement. We have no national database on which to make an assessment of the impact of asbestos related problems. In the same way we can not, at this time, decide the exposure limits related to our settings...” Can anyone say India has such national data available today – 22 years after this report was submitted?

Study team ‘B’ was headed by Dr. G. G. Davay. The team report noted: “...Some of [the] small scale units and pithead processing units had employed children and adolescents who were being exposed to heavy dust exposures. The team considers that this practice be prohibited.” Since this team did not visit any of the units in Gujarat we do not find any reference to asbestos use in Gujarat in this report. Though asbestosis is a notifiable disease under the Factory Act, notifications are not recorded by the Ministry of Labour.

Consumer Education & Research Center

The Consumer Education & Research Center (CERC) was established in 1978 with the objective of protecting consumer rights and interests. After reading an article published in the New Scientist, in June 1980 a lawyer working at CERC, became outraged, and after discussing the matter with colleagues raised the issue of asbestos hazards with the management of Digvijay Cement. The company wrote back telling her not to worry as due care of worker safety was taken. Not satisfied with the reply, the CERC sought permission to visit the facility. With much reluctance, the company permitted the visit by representatives of the CERC who found many lapses in the maintenance of safety standards. They expressed their concern with the management as well as the Factory Inspectorate, requesting that the Chief Inspector of Factories clarify the Inspectorate’s position and take necessary actions to ensure worker safety. Not satisfied with the responses received, the CERC decided to initiate Public Interest litigation. Since the nature of the issue was of national scope, they decided to file a petition with the

Supreme Court. The petition was accepted for consideration in 1986 but the judgment was long delayed.

Eventually, on January 21, 1995 an order arising from the petition was passed by the then Chief Justice of India, Justice Ahmadi. Important points in the order passed included:

- ◆ Maintenance of health records for 40 years since employed or 15 years after leaving employment (in the asbestos industry).
- ◆ National Institute of Occupational Health (NIOH) should decide on diagnoses in case of disputes.
- ◆ Rs.100,000 (\$3000) compensation to be paid to asbestos-related disease (ARD) victims.
- ◆ Special monitoring of small-scale units manufacturing asbestos products.
- ◆ Regular reviews of permissible limits for asbestos.
- ◆ Setting up membrane filter test facilities for measuring dust levels.

The Ahmedabad Digvijay Factory

The CERC petition to the Supreme Court of India asserted: “... the management of Shree Digvijay Cement Co. is responsible for discharging some of its employees who contracted asbestosis. It is also responsible for not taking any remedial actions for its employees who, in fact, were definite cases of asbestosis.” Supporting this statement was a Central Labor Institute (CLI) report on the factory in which it was said that 20 workers (6.5%) had definitely been diagnosed with asbestosis and 98 (32%) had suspected asbestosis. The petitioners claimed that none of the sick workers described in the report been given compensation for asbestosis or medical facilities for treatment etc.⁵

As reported in a Newsday article⁶ by Bob Wyrick:

“workers at Shree Digvijay said that both temporary and regular employees must wear their own clothes on the job. They have no shower facilities, no individual lockers. Regular industrial filter masks, which do not protect



A protest outside a hospital calling for better occupational health services.

"they explained that since they had neither expertise nor any equipment to diagnose asbestosis, they issued 'fit to work' certificates! "

against asbestos exposure, are provided to the permanent workers. Temporary workers, who might work at the plant every day for many weeks, are issued a face cloth about the size of a bandanna. They wear it bandit-style across the mouth. Floors are swept not wet mopped at this factory. When a worker gets asbestosis, employees said, he is moved to an easier job. As is typical in developing nations, there has never been a strike, much less a law suit, over safety conditions at the plant."

"Around Shree Digvijay Cement factory outside this city (Ahmedabad) are clustered nearly 250 huts. Most house the families of 300 'temporary' employees working as menial laborers in the factory. The huts – mostly consisting of one dark, low ceiling room with a dirt floor – are built from asbestos-cement trash thrown out by the factory, broken pipes and pieces of flawed sheet cement with ragged asbestos fibers exposed where the fragments have been broken."

Comments made by Dr. S. K. Kashyap, then deputy Director of the National Institute of Occupational Health in Ahmedabad, were also reported:

"He described the cutting room, where pipe and asbestos-cement sheets are cut to size with mechanical saws. 'You become white with dust,' he said. 'The air is full of it like makeup for the theater.' About 400 employees underwent physical examinations at Shree Digvijay. But the results of the tests would not be studied until similar tests were administered at all the asbestos facilities in India. 'There are definitely cases of asbestosis,' he said."

Discussing a survey in 1980 focused on asbestos manufacturing facilities in India that had been constructed and operated in collaboration with the world's largest multinational asbestos corporations, Barry Castleman also highlighted conditions at the Digvijay plant:

"In Ahmedabad, Shree Digvijay Cement Company Ltd. produces 50,000 tons per year of Asbestos cement pipe sheet. Its foreign collaborator is Johns Manville Corporation, the largest asbestos company in the Western Hemisphere. Asbestos laden solid wastes are dumped outside of the Ahmedabad factory in a completely wanton

manner. Children play on the waste dumps and workers are not informed of the lethal dangers of the dust."⁷

In the course of the Supreme Court hearing, the Court was informed by the petitioner that a Shree Digvijay worker, Sri Dhiraj Sonaji, had died of asbestos-related disease in May 1984. The Court passed an order to pay the heirs of the diseased worker the interim sum of Rs.10,000 (then around \$800) towards his compensation. Later, Digvijay Cement, though agreeing to pay the said amount, asked that the wording of the order be amended, since it claimed the cause of death was not definitely established. It wanted all mention of compensation to be removed and for the payment to be described as "compassionate." The Court, however, did not oblige.⁵

As mentioned earlier, in 1990, I was part of a small team making a film on the OHS situation in Gujarat. In the course of this project we interviewed some workers from the Digvijay factory union and their union leaders. We were also allowed to visit the plant. The workers told us about the problems they encountered. One of them said: "I am not given any specific information by the company on the hazards of asbestos but I know that it is dangerous as I can see a label on the bag with symbol of danger printed on it. We experience cough while opening the bag." He went on to explain that it was impossible for them to wear their face cloth for the full eight hours of a shift: "it gets clogged and we feel asphyxiation." Additionally, workers would have to remove these cloths to communicate with their colleagues. The trade union leader informed us that their biggest problem was that the doctors did not write diagnoses on case papers. However, if a doctor should record a clear diagnosis, they were "prepared to fight it out."

It was then that the late lawyer Rani Advani told me about a case where the CLI had identified 20 workers suffering from asbestosis. Following a request for the workers to be tested by the NIOH, of the 15 workers who turned up for the examination only 8 were confirmed to be suffering from asbestosis by the NIOH. Referred to the Employees State Insurance Corporation (ESIC) for treatment and compensation, they spent a week in an ESIC Hospital before being issued "fit to work" certificates. When the ESIC were asked, in the Supreme Court to clarify the criterion they used to arrive at "fit to work," they explained that since they had neither expertise nor any equipment to diagnose asbestosis, they issued "fit to work" certificates!⁸

With the plant running into trouble due to Union disputes and financial pressures, the Management declared a lock-out in 1996, shifting one section to their Sikka unit. In 1999, the plant reopened under the new name of Gujarat Composites, but recovery was short-lived and the factory finally closed in 2000. However, this closure did not end the suffering of the workers, most of whom were migrants staying in hutments close to the factory, as described earlier.

Kalyaneshwari, a voluntary organization, joined the struggle against asbestos in 2002, when they filed a complaint with the National Human Rights Commission (NHRC) relating to asbestos hazards to the community,⁹ representing a group of asbestos exposure victims from Gujarat and Rajasthan. Kodanthan Pani Azhakappan whose husband died



after 28 years of service at the Digvijay factory was one of this group. In 2003, the organization carried out a specific study to identify incidences of ARDs. Ninety-three former workers of the company participated in the study. They were medically examined after initial screening by means of a questionnaire. The workers' X-rays were then assessed by a reputable chest physician. Sixty-eight of the workers over 40 years of age complained of chest pain while 83% of all former workers complained of breathlessness. Twenty-four (25.8%) workers were found to be suffering from an ARD. Following the investigations, Kalyaneshwari filed a public interest petition in the Supreme Court, including a demand for adequate compensation for the ARD victims. However, judgment on the case is still pending – the most recent hearing being in January, 2008.

Asbestos in Power Plants: the Ahmedabad Electricity Company (AEC)

Raghunath Manvar, a power plant worker who had worked in boiler maintenance* at the AEC since 1966, observed in the course of his work that workers had become sick due to the poor work environment at the plant. He demanded that the NIOH conduct an investigation and to draw attention to his case, in 1980 during Diwali, went on hunger strike. At this, the Management backed down and itself called for an NIOH study. In the event, it was decided that the Central Labor Institute would carry out an Industrial Hygiene study while the NIOH would deal with the medical examination of workers. Subsequently, however, the recommendations made by these agencies were not implemented and Raghunath felt compelled to lodge a complaint with the Gujarat High Court. His complaint was accepted by the Court and notices were issued to the concerned parties in February 1984. While waiting for the case to be heard, Raghunath came across a woman – Savitridevi – working as a day laborer. She complained that her husband, a permanent employee of the power company had been forced to accept early retirement on health grounds and that she had been employed in his place. Her husband was sick and attending various hospitals but the hospital authorities did not give him proper treatment. She asked Raghunath to intervene. Agreeing to do so, Raghunath visited her husband, Kishan Goplani (below), at his home, where he was shown some

medical papers. Not understanding these, he sought my help, sending me the documents in question. When I went through the papers, I was surprised to see a note written by the doctor treating him at the Public Hospital. The doctor had written: "Occupational Lung Disease." Questioning Raghunath about Kishan's occupational history, I was told that he had worked as a mason for 18 years. I asked another question: "what materials did he handle?" It was then that I learned that Kishan had used asbestos, which was mixed with cement for repairing boiler walls. I guessed then that he was probably suffering from ARD. Raghunath's lawyer had experience with asbestos litigation, and had previously petitioned the Supreme Court on an asbestos issue when working with CERC. She lost no time in filing a petition at the Gujarat High Court demanding diagnoses for Kishan and 7 other workers exposed to asbestos. The Court immediately passed an order directing the NIOH to examine Kishan and report to the Court. After the NIOH had examined Kishan on April 1, 1996, and confirmed asbestosis, on May 5, 1997, the Court ordered the Ahmedabad Electricity Company to pay Rs. 25,000 as interim compensation pending a final order. Regrettably, Kishan had breathed his last on April 11, 1996, only 10 days after his examination by the NIOH. Out of the remaining seven workers in the case, two died before they could be examined and only one – Mangabhai Patel – was eventually diagnosed with an ARD; on June 24, 1997 the Gujarat High Court ordered a payment of Rs.10,000 (then around \$280) from his employers.

Raghunath Manvar formed the Occupational Safety & Health Association (OHSA) in 1998 to keep up the struggle of the power workers to obtain proper health and safety regulations and social justice. In the Kalyaneshwari study mentioned earlier, nine power plant workers were included – all nine were found to have ARDs. In addition, spouses of three of them also were found to be suffering from ARDs due to secondary exposure.

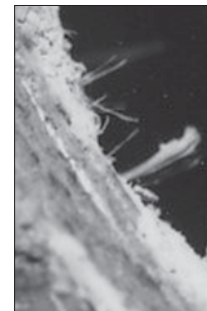
The power company claimed, in a written submission to the Chief Inspector of Factories in 1995, that it had discontinued the use of "asbestos fibre" and "asbestos powder" for insulation but gave no date when this had occurred. However, the company admitted that asbestos rope was continuing to be used, but in reduced quantities as evidenced by a table included in the submission (below).¹⁰

Year	Quantity used in kg/year
1993-94	1228 kg
1994-95	745 kg
1995-96	342 kg

Contradicting the above claims, workers allege that asbestos is still (2008) widely used by the company.

There are elaborate provisions in the Factory Act for monitoring workers' health but it has failed miserably in protecting workers' health. Medical records maintained by the AEC did not show any abnormalities.

On June 6, 2007, a temporary clinic ("diagnosis camp") was set up to carry out medical checks on 20 workers from the AEC and the Digvijay factory. After taking occupational histories and conducting clinical examinations, the workers' X-



Kishan Goplani

*Asbestos is used in power plants for boiler and turbine insulation. For turbines it is used for insulation on cover body, HP heater, LP heater, main steam pipe, glands for steam valves, and in the form of asbestos rope on small steam tracing pipes. In the boiler section it is used on the dead zone, steam header, steam pipes, oil burner nozzle, ducting windows, all types of valves and packing.



Asbestos disease victims Prabhulal Berwa and his wife Anandivedi, whose exposure to asbestos came from her husband's work clothes.

rays, were assessed by Dr. V. Murlidhar, an expert in the field, using standard ILO plates for comparison. The results were as shown below:

- ◆ Eight had asbestosis – five AEC workers, one spouse of an AEC worker, two Digvijay workers.
- ◆ One lady had coal miner's pneumoconiosis – AEC worker.
- ◆ One had asthma – Digvijay worker.

One of the workers was being treated, irrationally, for TB; there was no radiological indication of this disease. Another receiving treatment for TB had healed lesions. Possibly, asbestos induced pleural plaques were being misdiagnosed in these cases, and elsewhere.

Raghunath tells of a classic case revealing how decisions regarding ARDs are taken by medical professionals. The NIOH, acting on a High Court order, had examined a number of asbestos-exposed workers and diagnosed two with ARD. Later, in 1997, the ESIC Board also examined these workers. Following the examinations, as the Board medical experts were leaving, one asked Raghunath why he had not brought a worker whom he had examined earlier and found to have ARD. Raghunath indicated one of the workers and told the expert that this was the same person the expert had examined previously at the behest of the High Court. On hearing this, the expert immediately called the man over and, after a brief conversation, announced that he had changed his decision, reverting back to his previous diagnosis. This is how they work – medical decisions made to order.

Workers have to struggle for compensation in spite of the Supreme Court order of 1995, and the legal processes are extremely slow. Since the NIOH was made the authorized body to verify asbestos-related diseases, when the OSHA decided to settle the case of the power workers out of court, the AEC insisted on a fresh examination of the workers by the NIOH,

even though some had already been found to have ARDs in NIOH examinations undertaken in 2005. In the new tests, carried out in November 2007, the NIOH failed to confirm its original diagnoses, leaving the out-of-court settlement cases of the five workers in limbo. However, Raghunath was able to obtain compensation for the two victims identified by the NIOH following the 1996 Court Order. The late Kishan Goplani's daughter received Rs.150,000 (then \$4170) and Mangabhai Patel Rs.160,000 (\$4450).

Other Sources of Asbestos Exposure

As mentioned earlier, the ship-breaking facility at Alang, now reputed to be the largest in the world, is the site of hazardous exposures to asbestos (and other toxins). This is the subject of a detailed exposé by Gopal Krishna elsewhere in this monograph. However, my own experience includes a visit to the Alang yards in 2005, when I observed a heap of asbestos fiber originating from a ship being broken at the time. I asked my guide, a field worker employed by a voluntary organization, working on HIV/AIDS with migrant workers, whether he knew what it was. I should have been surprised when the man, himself employed in the health field, expressed his ignorance, but, such is the low level of public awareness of asbestos hazards in India, that I was not. In Alang asbestos may be seen everywhere – spread from the beaches into the town and the primitive dwellings of the migrant workforce.¹¹

I also remember a day in 1988 when I visited a small unit manufacturing safety gloves to invite the owner to participate in a safety exhibition my group was organizing. Entering the gate I could see some workers busy sewing gloves inside. It was morning and sunrays filtering through a window behind the workers revealed dust particles floating in the air. Passing by the workers to meet the owner, I observed that the gloves were being fashioned from asbestos cloth. Much later, in 2000 or so, I received a visit from a renowned photographer, Hein du Plessis from South Africa, who was assembling a photographic dossier of asbestos workplaces and victims of asbestos misuse in India. I took him to a safety equipment trader having a shop right in the heart of the city of Vadodara. We observed pieces of material, that would later be used to make asbestos gloves, being cut from a big roll of asbestos cloth stored on the premises. The gloves were made in a sewing room situated in an added mezzanine floor of the shop which was barely 4 feet high. Unable to stand the workers sat hunched at their sewing machines. Huge mounds of asbestos gloves were stacked around them. The trader informed us that gloves were also sewn by homeworkers, a fact which I observed for myself when I visited a residential area in Baroda.

Gujarat also has a factory manufacturing asbestos-cement sleepers for the railways.

Once, in 2006, I had occasion to visit a new cancer hospital. On being introduced to a head of department there, I asked if they were getting any cases related to asbestos. Answering in the affirmative, he gave me a list of 11 patients who, he thought were suffering from ARDs. Unfortunately, for operational reasons, we have not yet conducted further enquiries into the status and exposure history of these patients.

On February 21, 2008, funded by a grant from the Gujarat Department of Labor, the PTRC conducted a training session on Health & Safety at Rajkot. The participants were shop-floor workers from local industries. They became particularly interested when I brought up the subject of asbestos. Workers from two units informed me that they were using asbestos powder in furnace insulation material; one of the participants, a mason using this material, said he had never heard of the hazards of asbestos. They wanted more information which I gave happily. In their written feedback on the program, most expressed they had learned valuable lessons – for the first time they had become aware of the hazards of asbestos and the toll it had been taking in India and globally.

Compensation for Asbestos-Related Diseases

The Employees State Insurance Corporation, formed under the provisions of the ESI Act, is responsible for paying compensation to insured persons for listed occupational diseases. Asbestos-related diseases are listed diseases. In Gujarat, the ESIC has paid compensation to just eight workers for ARDs.¹² All were employees of Digvijay Cement. Another possible source of compensation is the Workmen's Compensation Act, but I have not heard of any successful claims under this Act in Gujarat.

Conclusion

It is evident from the reports we receive, that the 1995 Supreme Court order regulating the asbestos industry is not being implemented properly, neither are the provisions of the Factory Act relating to occupational health and notifiable diseases. In the present climate of trade liberalization, trade unions lack the power to challenge the prevailing crisis of governance. However, the activities of some NGOs are making some impact; victims and their families are waking to the threat that asbestos poses and coming forward to set up their own support groups.

More research is needed. At present, for Gujarat and India generally, it is not known: how much asbestos is used in particular locales, how many and which workers are exposed to asbestos dust or how many are suffering from ARDs. The workers for their part do not know where and from whom to seek medical help and justice. Workers need to be informed of asbestos hazards. Government has to be pressured for better implementation of laws.

The Supreme Court settled on the NIOH to be the final authority in diagnosing ARDs. There is a need to set up a panel of experts drawn from different institutions to verify diagnoses rather than this single authority. No one knows about the inner workings of the NIOH: whether at any given point of time they employ suitably experienced clinicians; whether decisions are taken individually or by a panel. There should be some provision for challenging their decisions.



Safety gloves sewing room, Vadodara.

"MONITORING" ENVIRONMENTAL POLLUTION AND ASBESTOS EXPOSURE IN GUJARAT

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The information contained in this paper is based on a three week visit to India by the researcher in March, 2007.

Industrial investment is highly sought after by the Gujarat State. As one of India's most industrialized states, it is strong in engineering and electronics and produces petrochemicals, fertilizers, pharmaceuticals, drugs, dye-stuffs, and textiles. After the Government of India introduced the New Industrial Policy in 1991 (intended to create economic reform in the industrial sector), the state of Gujarat aggressively promoted and facilitated new industrial development through concessions and subsidies.¹ In 2007, nine manufacturing units or factories were reported to use asbestos, producing asbestos-cement sheets and pipes. Most of these factories employ only a few full-time workers, although one employs over 200 workers. Three of these factories still use dry processing, while the remaining six use wet processing. The State Director of Industrial Safety and Health claims that factory medical records over the past 40 years, including pulmonary function tests, blood and urine tests and chest X-rays, demonstrate that asbestos is safe and exposure is actually very limited. He said asbestos was controlled mechanically by using wet processing techniques and personal protective clothing and claimed that workers using the wet processing are not susceptible to disease: "Because of all of this, we have had no cases in the last three years. This is the achievement of the IHL [Industrial Hygiene Laboratory]." Based on their records, the department identified only two cases of asbestosis in 2002/2003.*

Officially, Gujarat factory workers who are exposed to asbestos are examined bi-annually by a Factory Medical Officer. This examination includes pulmonary function tests and chest X-rays and health records are maintained for each worker (for up to 40 years). In addition, the work environment is monitored, and workers are provided with safety equipment and masks. Despite the fact that it is the industries themselves which control the dust collection systems, the State of Gujarat is proud of its safety record and argues that it is able to detect disease at an early stage. Gujarat is therefore portrayed as "number one in terms of safety"[†] and other states seek to emulate its performance.

Gujarat's performance and occupational health levels are also believed to have been influenced by God. State officials point to the fact that there have been no major accidents – like Bhopal – in this state. This is because "God is here in Gujarat, who takes care of all these things." To date, disaster management has not included spirituality and this is a "missing dimension." Spirituality will make you "more aware of your soul who is running your body and taking care of your own health." If workers and industry "believe in God, trust in God and work with God, then production, health and safety would be in a good condition." Having spirituality means that, even if unsafe conditions prevail, the workers will be "well aware" and accidents will not happen. Telepathy and sensors in their bodies will enable workers to guess that something is going to happen and to take

preventative action. Following this line, some State doctors argue that the majority of illness is psychosomatic and stems from the stressful conditions workers experience. But if they can achieve a mental balance and supreme energy from their spirituality, then they will be in a much better position to deal with this. Termed "Disaster Management with a new and unique approach," this approach means that workers are themselves to blame for their illness and therefore should seek compensation through their beliefs and increased religious piety.

Bharuch houses one of the biggest industrial estates in India. Although the Department of Industrial Safety and Health monitors the asbestos factories there, it does not have the equipment to record the presence of airborne fibers when conducting annual inspections of factories. Department representatives are, however, aware of the difficulties associated with controlling fibers and keeping factories 100% safe, and of the manner in which developed countries "get themselves safe while sending hazardous industries to developing countries."

A manager of an asbestos-cement factory argued that "if asbestos is safely produced, then there are no problems." This company reported that it had had no sick workers and no complaints after medical check-ups in the past 15 years. In a demonstration of the manager's lack of concern for asbestos hazards, he took us into the factory – where several young bare-chested men were weaving strings of asbestos yarn into ropes without gloves or masks – and fetched a handful of asbestos fibers for us to see. Throwing the fibers onto the ground, he reached into his pocket with the same (unwashed) hand and passed us all cotton masks for our mouths. Alongside us, the storage drum for the glycerine-based wetting agent was completely empty and was clearly not being used. These actions contravened the Gujarat Factories Rules, 1963,[‡] but neither the factory manager nor the official State factory inspector who accompanied me, seemed concerned.

This is a demonstration of "unofficial" government policy. The flouting of regulations is a widespread and well-recognized feature of India's industrial development.^{2,3} "In the Indian context, some things have no relevance" said a representative of the Asbestos Information Centre (AIC) during an interview in Delhi; it is of interest to note that the business card of this individual indicated that he also represented the Asbestos Cement Products Manufacturers Association. He continued:

"the mistakes [made by European countries] stem from the use of blue and brown asbestos which were used during the period of ignorance with high concentrations. But now levels of workplace exposure are controlled. There were no precautions and people used the material very freely. Now people understand and precautions have been taken. India's environmental pollution [control] is very advanced and based on international levels. No asbestos

* One doctor working in Gujarat does not, however, accept these figures. He comments that he "cannot expose the government," but that he has come across more than 10 cases of asbestosis in the past few years.

† Interviews with government officials from the departments of Industrial Safety and Health and the Industrial Hygiene Laboratory.

‡ Gujarat Factories Rules, 1963, Schedule XVII specifies that the number of workers exposed to asbestos should be kept to a minimum, that the area of activity should be clearly demarcated and indicated by warning signs restricting unauthorized access, the need for exhaust ventilation in any room where asbestos production takes place, the use of protective clothing and breathing apparatus, the regular testing of ventilation equipment, separate accommodation for personal clothing, washing facilities, a prohibition against the employment of young people and smoking, regular air monitoring – conducted once every shift and entered in a special register (A-252 – A-258).

is seen in the entire factory, no-one touches it."

These comments clearly do not apply to daily practice at the factory described above, where many people are exposed to asbestos every day and there are few attempts to control it or to limit workers' exposure. Indeed, as one NGO worker pointed out, monitoring is, in effect, a means of protecting the industry. For example, if a victim complains to the Pollution Control Board, it is most likely that officials from this board will take a bribe from the factory and the case will not be investigated. Even if the factory is "officially closed," this happens on paper only, because the factory only has to write a promissory note explaining that the problem will be addressed in order to revoke the closing order. In practice, work continues as normal. This lack of effective control over exposure is also reflected in the regulations around polluting industries. Companies which are considered to be polluting have to submit Environmental Audits every 6 years. But it is the act of monitoring – rather than the content of the reports – which has significance. Once submitted, these Environmental Audits are not scrutinized or analyzed. Thus the Gujarat Pollution Control Board is reported to have commented that despite receiving over 700 Environmental Audits, there have been no irregularities and no need for follow-up action.

The AIC is thus partly correct when it argues that "in the Indian context, some things have no relevance." These "things" are workers' exposure to asbestos, fulfilling legislative requirements, monitoring of the environment and industries' commitment to "safe production techniques." The latter are manifested as symbolic performances in which it is the appearance of doing that matters rather than a commitment to environmental or occupational health. This appearance of doing is ultimately about facilitating economic growth at all costs. A retired Justice from the High Court of Gujarat explained that there is, in fact, an unspoken agreement between industry and the State which hinges on the assumption that economic growth is critical for India:

"The argument from the government usually is development and they use the word sustainable development, but the emphasis is on development. Their usual argument is that if there is development, then there will be employment, production and generation of the benefits of development. And the government will for some time condone the breaches. That is how things are happening. They say that we don't have the option to develop or not to develop. For example, if the Blue Lady had not come to India it would have gone to China and many other ships would be diverted to China. Ship-owners would think that China is the place where there would not be difficulties and if you were to compete with China, we would have to compete on all aspects...So we have to make sacrifices for development. The argument boils down to: do we want to develop or not develop? If you go by all these standards, you can't develop. Therefore you have to balance something, compromise something."

This compromise – at the expense of the workers – is also demonstrated in the case of the Digvijay Cement Company. In 1997, the workers from the Digvijay Cement Company approached an Ahmedabad NGO explaining that they were experiencing breathing problems and complaining



about asbestos-cement roofs. Although the NGO had no "deep scientific knowledge" about this, after reading up on the topic its members agreed that asbestos is dangerous. The NGO arranged for the workers to call a journalist from the Times and showed them how to write a simple letter to the High Court.

On October 8, 1997 Anilkumar Mohanlal Poddar sent a letter to the Gujarat Pollution Control Board stating that the Digvijay Cement Company was manufacturing asbestos and other allied products and that these caused serious health hazards to people working there and residing in the vicinity. His father, who had worked for this company, had died of lung cancer in August 1996. Poddar argued that particles of asbestos and cement could be seen floating in the atmosphere and were also visible in the water provided by Digvijay Cement to its residential colony. In his Affidavit, he commented that asbestos fibers were present in the drinking water, that waste asbestos was being dumped at the rear of the factory, that land was being denuded, that workers were denied knowledge of their company medicals and finally that, as a result of all these factors, people residing in the vicinity of the factory were also prone to asbestos diseases. Many other workers and residents of Ranip town supported Poddar's claims and wrote accompanying letters to this effect, requesting immediate remedial action.

"several young bare-chested men were weaving strings of asbestos yarn into ropes without gloves or masks"



Should this not be forthcoming, the people of Ranip threatened to “resort to mass agitation” and also take the company to the criminal court for culpable negligence.

Digvijay Cement filed an Affidavit-in-Reply, in which it declared that Poddar’s allegations were “completely baseless” and that this letter had been written out of “spite and vengeance” because his father was dismissed for “gross and serious irregularities.” The Affidavit-In-Reply states that: “In our factory, we are maintaining the safe dust exposure limits as prescribed under the Factories Act, 1948. Hence there is no chance at all for the persons residing in the vicinity/colony to contract diseases like cancer or TB due to the exposure of asbestos/cement dust.” It also denied that asbestos particles were present in the water or air while specifying that, according to the WHO, the ingestion of asbestos particles was not dangerous and denied that the surrounding areas had been decimated of vegetation.

In its defense Digvijay Cement argued that:

“The process of manufacturing in the plant is so devised by engineering controls, automation and full proof [fool-proof] enclosures to ensure that the asbestos fibres do not become air borne at any stage of production. The asbestos fibres are not used in dry form. The asbestos is used in wet form and therefore does not get air borne. Even the use of asbestos in wet form in manufacturing process is carried out in air tight enclosures as a result of which the asbestos fibres do not become air borne. After the asbestos is bonded with cement for manufacturing sheets and pipes, the asbestos fibres do not get air borne. Thus, the process of manufacturing is so devised that the asbestos fibres do not get air borne nor the workmen are exposed to the environment containing asbestos fibres. ... It is submitted that the workers cannot contract disease like lung cancer or TB due to exposure to asbestos/cement dust since all safety precautions as required by Factories Act have been taken and the workers are not exposed to asbestos or cement dust. I say that every worker is examined medically once a year. The chest x-ray of all workmen is taken once in a period of three years. It is, therefore, submitted that the view that industry of the answering respondent can cause air pollution and diseases like lung cancer and TB is absolutely theoretical and speculative. ... The use of asbestos and industries manufacturing asbestos products are not banned in India nor even most advanced and industrialized countries like, America, Canada and other European countries.”

In a case such as this, the judge has the discretion to invite someone to be “*Amicus Curie*” or “Friends of the Court” and to participate in the case. When the court called the Paryavaran Mitra (Friends of the Environment) NGO to be *Amicus Curie* in the case against the Digvijay Cement Company, they immediately agreed and their lawyer requested that a national institute be commissioned to prepare a re-

port. Despite the fact that Digvijay Cement reacted strongly against such an assessment and report, the NIOH was contracted by the Gujarat High Court to assess the health hazards. It conducted air sampling at three sites around the Digvijay factory and concluded that: “Fibre concentrations in the vicinity of the factory were very low and adverse health effects i.e. asbestosis, lung cancer and mesothelioma of pleura and peritoneum have not been confirmed at these levels.”⁴

Paryavaran Mitra then contested this report as it was seen to “favour industry.” The NIOH had recorded asbestos fiber concentrations which ranged from 0.0043 to 0.0055 fibers/ml. A spokesperson of the NGO argued that the report was neither “reliable nor scientific” because it did not include factors such as wind direction, and other micro-meteorological factors.⁵ Although the NIOH had taken samples for 24 hours, it had done this 20-30 feet above ground level and not, as Paryavaran Mitra pointed out, at breathing level. It had also not investigated water and soil contamination and had overlooked the production process, ignoring cutting and grinding activities. The High Court was, however, happy to accept the conclusions reached by the NIOH on the basis that it had been trusted to do this type of study in the past and stated that “We, therefore, prefer to place reliance upon the report of the NIOH.” The only thing to come out of the NIOH report was that air particles should be monitored and the report recommended that the company itself undertake regular monitoring so that the records could be produced on demand if necessary. That was the end of the issue. With regular monitoring, Digvijay Cement was able to continue operating as normal. The High Court decided that the grievance voiced by Anilkumar Mohanlal Poddar “does not appear to be completely acceptable.” The Gujarat Pollution Control Board should, however, carry out quarterly inspections of the premises and, if necessary, instruct Digvijay Cement on any necessary remedial measures (order dated 20/04/1999 for SCA/8617/1997 special civil application No. 8617 of 1997, *Suo Motu versus Gujarat Pollution Control Board*). As is clear from this example, the primary focus is on monitoring, but there is little attempt to challenge any assumptions which frame the manner in which monitoring is carried out. Instead, monitoring is seen as an end in itself.

These examples demonstrate how the State Government of Gujarat, in seeking to attract foreign investment and international exchange, has avoided regulating capital and industries.⁶ Industries have thus been given a free reign and have been able to bypass their social and environmental obligations, under the guise of “monitoring” the presence of asbestos fibers and wet production procedures. Given the absence of the State in the arena of occupational health and environmental pollution control, NGOs have sought to address these issues (cf. Lipschultz, 2004). These have, however, been subject to control by the State through conventional and innovative means, such as threats of western bias, inadequate technology to measure asbestos exposure, the emphasis on monitoring and by framing asbestos risk as a controllable process.

ASBESTOS-RELATED DISEASE IN INDIA

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Although mesothelioma and asbestos-related lung cancer are recognized around the world, in India neither one of these diseases is commonly reported. This is not surprising as in India, cancer is not a notifiable disease. While there are some regional cancer registries, poor data collection and inadequate death certificate registration combined with other factors result in a spectacular underestimate of asbestos-related cancer. According to data from regional cancer registries in India, between the years of 1993-1997 there were a total of 56 mesotheliomas.

Mesothelioma Incidence in India (1993-1997)

Region	Number of Mesotheliomas*
Delhi (1993-1996)	7
Bangalore	7
Madras	7
Karunagappally	0
Mumbai	33
Nagpur	0
Poona	2
Trivandrum	0
Total	56

The fact that the Ministry of Labour does not collect data on morbidity or mortality for occupational diseases further compounds the information vacuum. Considering that asbestos was widely used in India with few, if any, restrictions, and considering that life expectancy is now 55-60 in rural areas and 65-70 in urban areas, there can be no doubt that the incidence as documented above does not reflect the reality of the country's mesothelioma incidence.

Diagnosis and treatment of asbestos-related diseases in rural regions, which constitute about 70% of India, are inadequate. When workers return to their villages due to illness or after retirement, they have no access to post-employment follow-ups or medical care for asbestos-related diseases. General practitioners and even some specialists outside medical institutes misdiagnose occupational diseases including those caused by asbestos due to lack of medical training.

Poor people with asbestos-related diseases are marginally better off in urban areas where they can obtain access to medical care at civic, government or charity hospitals; some are referred to specialist medical centers for treatment however, the quality of the care with respect to poorly understood asbestos-related diseases is variable. As elsewhere, private patients, of course, receive a higher standard of care. It is routine for autopsies to be carried out on private patients who die from an asbestos-related disease for medico-legal purposes.

At our institute, the King Edward Memorial (KEM) Hospital in Mumbai, we have seen one case each of mesothelioma, lung cancer and bilateral pleural effusion in asbestos-exposed workers. We have access to good equipment and are able to do detailed medical investigations of patients

including chest CT scans, arterial blood gases at rest and exercise, bronchial lavage for asbestos bodies and biopsies. Numerous cases of asbestosis have been diagnosed by staff in the respiratory medicine department at the KEM Hospital. In the early 1980s, we studied chest radiographs of 800+ workers from the asbestos-cement industry; 28% were found to have asbestosis and a further 8% showed signs of early lung changes. Subsequently, we assessed radiographs of workers at two brake lining factories – in Mumbai and Ahmedabad; similar frequencies of the disease were found. In 2003-4, I studied chest radiographs taken in various asbestos-cement plants and asbestos mines; the results are tabulated below.

Asbestosis Incidence in India (2003-2004)

State	Number Examined	Number with Asbestosis	% with Asbestosis
Tamil Nadu	140	31	22
Rajasthan (1)	49	24	49
Rajasthan (2)	111	86	77
Gujarat	108	48	44
Total	408	189	

The prevalence of asbestosis depended on the type and degree of asbestos exposure experienced. We have seen lung fibrosis even after one year of exposure. Other medical centers that have examined patients with suspected asbestos-related diseases include: the National Occupational Health Institute in Ahmedabad, the Industrial Toxicology Research Centre in Lucknow and the Central Labour Institute in Mumbai.

In my experience, pressure on doctors from industry executives or central government to water down the prevalence of occupational ailments or misdiagnose asbestos-related disease as tuberculosis or bronchitis is common. Once a patient has been diagnosed with an occupationally-caused asbestos-related disease, they can attempt to obtain compensation for their illness. Unfortunately, this process is cumbersome and complex and the number of successful claimants is small. While I personally have no knowledge of individuals receiving compensation for asbestos-related diseases, I have heard anecdotal reports that some claimants have received small amounts of compensation from insurance panels.

Conclusion

There is underreporting in India of asbestos-related conditions such as mesothelioma, lung cancer and asbestosis; our research has shown that the incidence of asbestosis in mines and factories is high. Public statements by asbestos processors such as manufacturers of asbestos-cement roofing and asbestos-containing brake linings that with modern asbestos processing methods there is hardly any hazardous occupational exposure are no guarantees of safety. The high incidence of disease in workers from asbestos-cement roofing plants underlines the need to replace asbestos cement sheeting, the "poor man's roofing choice," with a safer alternative.

* Data from *Cancer Incidence in Five Continents Volume VIII*, Edited by DM Parkin, SL Whelan et al. International Agency for Research on Cancer 2002; data from Mumbai reported by Dr. S. Kamat.

DIFFICULTIES IN THE DIAGNOSIS OF ASBESTOSIS IN INDIA

DR. V. MURLIDHAR



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In developing countries, there are many obstacles to the recognition of asbestosis as an occupational disease and to the translation of such recognition into realized rights to treatment or compensation. My experience is based on 18 years of work as a physician and activist with the Occupational Health and Safety Centre (OHSC), Mumbai and also my involvement with asbestos workers of the Hindustan Composites Factory in Mumbai.

Scientific Uncertainty and Political Expediency

Like many chronic occupational diseases asbestosis exists in a climate of uncertainty, concerning exposure controls, diagnoses and assessment of disability. Exposure limits and disability assessments are often influenced by socio-political factors, while reliable diagnoses depend on access to suitable diagnostic tools and appropriate training of clinicians. There is frequently uncertainty about the precise source of asbestos exposure, and about the nature and speed of the disease processes – despite the public perception that medicine is an exact science. This uncertainty is compounded by the lack of a clear regulatory framework and the lack of understanding among concerned parties about the limited legal regulations. I will elaborate on some of these issues.

The differences among various countries in the threshold limit values (TLVs) for dust levels that are considered safe in the workplace indicate that assigning them is not an exact science. But are these levels based on science at all? The fact that poorer countries generally have higher TLVs implies that political factors are involved – not that people in poorer countries are more resistant to the development of asbestosis or asbestos-related cancer. Also, these standards tend to change with time depending on the dialectics between industry and activists seeking to improve workers' welfare.

Disability Assessment

The assessment of disability for occupational lung diseases including asbestosis using the standard Impairment Assessment Guidelines is rather arbitrary. While the guidelines prescribe some spirometry values (FEVs and FVCs) they also relate levels of disability to vague descriptions of breathlessness (dyspnoea):

- ◆ Up to 25% – dyspnoea, when it occurs, is consistent with the circumstances of activity.
(FEV1 >80% and FVC >80% and FEV1/FVC ×100 >75%, of predicted values)
- ◆ 26-50% – dyspnoea does not occur at rest and seldom occurs during the performance of the usual activities of daily living. The patient can keep pace with persons of same age and body build on the level without breathlessness but not on hills or stairs.
(FEV1 60-79% or FVC 60-79% or FEV1/FVC ×100 60-74%, of predicted values)

- ◆ 51-75% – dyspnoea does not occur at rest but does occur during the usual activities of daily living. However, the patient can walk a mile at his own pace without dyspnoea although he cannot keep pace on the level with others of the same age and body build.
(FEV1 51-59% or FVC 51-59% or FEV1/FVC ×100 41-59%, of predicted values)
- ◆ 76-100% – dyspnoea occurs during such activities as climbing one flight of stairs or walking 100 yards on the level, on less exertion, or even at rest.
(FEV1 <50% or FVC <50% or FEV1/FVC ×100 <40%, of predicted values)

Here, FEV₁ is the volume of air that can be forcibly exhaled in one second while FCV is the total volume that can be forcibly exhaled.

Of key importance in the use of such guidelines, especially in legal claims, is the aura of scientific legitimacy surrounding the procedure. Despite the reality that there is very little scientific rigor in the assessment of disability, the popular perception is just the opposite.

Diagnosis

Asbestosis is diagnosed if a worker has an occupational history of asbestos exposure extending over at least 15 years and radiological findings typical for asbestosis are found. Clinical examinations are not required for diagnostic purposes, but have a role in determining treatment options. Pulmonary function testing, as indicated above, is used for impairment assessment, rather than diagnosis.

While a chest X-ray that clearly shows the characteristic signs of asbestosis requires no further imaging procedures for a positive diagnosis, a high resolution CT (HRCT) may pick up more cases, since earlier stages of the disease may be identified. However, financial constraints limit the physician's use of HRCT in India.

It is important to clearly distinguish asbestosis from tuberculosis (TB); asbestosis in India has been misreported as TB in the past. Though the classical finding for asbestosis is a restrictive impairment in lung function, one third of the cases may have an additional obstructive element.

Of course, asbestos exposure can also lead to lung cancer and mesothelioma. However, whereas early stages of asbestosis may be revealed by HRCT, the development of asbestos-related cancer is an extremely complex process, and at present there is no way to predict which chromosomal damages caused by asbestos will lead to malignant disease within the lifetime of an exposed individual. By the time symptoms appear it is generally too late for medical intervention. The best hope for those already carrying asbestos-damaged cells lies in a better understanding of the processes underlying all malignancies. For the present, responsible governments should at least curtail all further exposure to asbestos by imposing comprehensive bans.

Performance of Medical Professionals

In India, there are major hurdles that obstruct the process of recognizing occupationally caused conditions like asbestosis and claiming compensation for occupational injury. Unfortunately, "Occupational Health" is taught as part of the much-maligned subject of Community Medicine, and students rarely have access to standard ILO radiological plates, mandatory for asbestosis diagnosis, even in the top medical colleges. This, in addition to the fact that there is no postgraduate degree in occupational health available at any of the major medical colleges, probably explains why doctors are so poorly trained in the recognition and diagnosis of occupational diseases – particularly pneumoconiosis (the group of diseases to which asbestosis belongs). Consequently, even a first-ranking radiology physician, lacking the expertise to diagnose asbestosis unambiguously, may be compelled to certify an X-ray as normal when it is not.

Although the ILO standard plates are expensive and difficult to procure they *are* available to students in some institutes, like the Central Labour Institute (CLI), that offer diplomas in occupational health. But, the candidates chosen to attend such courses are mainly industry-appointed doctors who learn about the diagnosis of lung diseases in order to arm themselves – so that they can better argue against genuine asbestosis claims.

Though any registered medical practitioner in India is legally eligible to diagnose occupational diseases, many believe that it requires a specialist to diagnose asbestosis. The asbestos industry allows this misconception to persist – it is to their advantage to restrict widespread reporting of this disease.

The attitude of doctors and other professionals involved in diagnosing asbestosis is also influenced by a bias among the professional class against blue-collar workers in general. At times, this has led to professionals deliberately misguiding workers who came to them with occupational and environmental health problems related to asbestos. Senior medical practitioners are employed by the industry to give evidence against asbestosis claimants; the fact that many knowingly give false testimony is totally unethical.

Unethical Research

When a study is carried out on a cohort of workers, the findings are not made available to anyone except the select few conducting the study, and so are not open to public scrutiny. Many studies on occupational diseases, including asbestosis, are carried out by students from the top medical colleges and also by institutes like the Central Labour Institute and the National Institute of Occupational Health (NIOH), the premier institute of occupational health in India. These studies help students to obtain their diplomas or enhance their CVs, but the results are not made accessible to their medical colleagues let alone any workers found to be suffering from asbestos-related disease. On being questioned as to why they do not inform such workers of their findings, they offer the argument that, in epidemiological research individual cases are of lesser importance than the whole – or that the results may be given to the relevant authorities, which means a sponsoring industry on many occasions. In fact the only place data obtained in these studies is likely to appear is at occupational health conferences in five-star hotels, sponsored by industry.

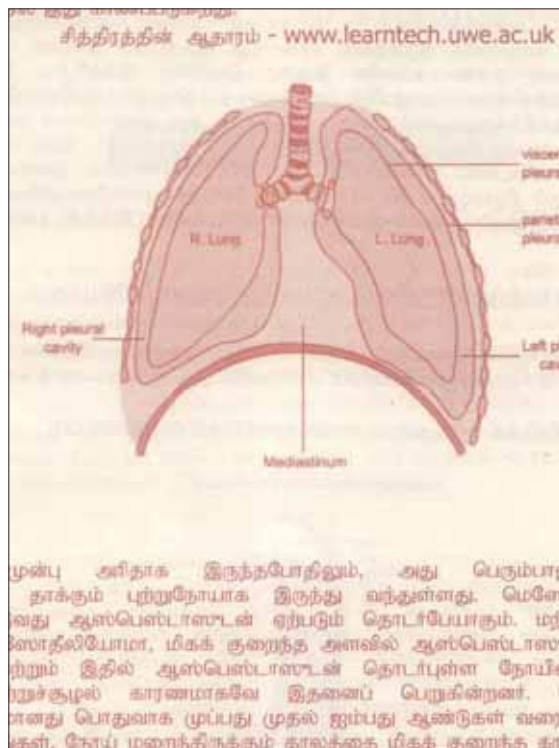
These practices have created a situation in which, even though there has been a great deal of data collected in India relating to occupational disease, hardly any data on occupational disease have been made available to the general medical community. This has led to the projection of India as a country with low levels of occupational disease and thereby with a healthy working environment. A common occupational disease like noise-induced hearing loss was officially recognized only in 1998, when the Occupational Health and Safety Centre (OHSC), Mumbai published its findings after a long struggle. It is obvious that the occupational diseases diagnosed in India are just the tip of an iceberg.

Should an occupational disease related to asbestos be identified, workers face further problems in gaining medical or disability certification. Neither is given readily, while disability certification, which is required for compensation, is frequently not understood by doctors and hence not given to workers. Lawyers, even those whose general stance is pro-worker, tend to have a poor knowledge of progressive laws related to occupational health.

Workers' Movement Setbacks, Apathy and Red Tape

There have been several serious setbacks to workers in the past two decades. The failed textile strikes of the 1980s were followed by the rapid closure of factories and sacking of workers in major industrial belts like the Thane-Belapur region near Mumbai – due to the onslaught of the new economic policy pushed by governments, amidst forces of economic globalization, liberalization and privatization.

"When a study is carried out on a cohort of workers, the findings are not made available to anyone except the select few conducting the study, and so are not open to public scrutiny".

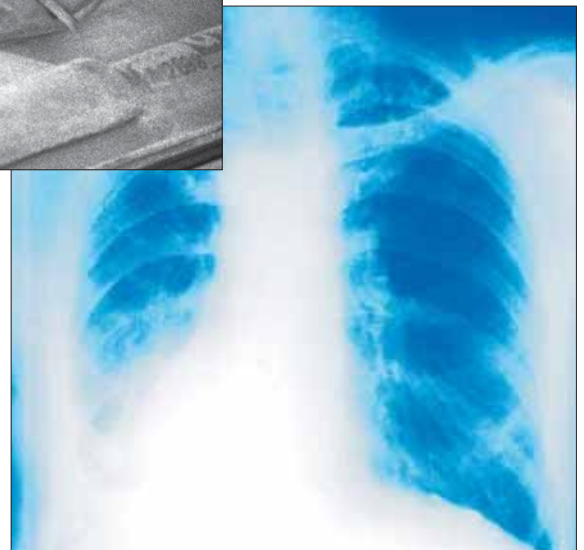


The factories were relocated to new areas in the interior of India where the workers could be employed on a contract basis without social security cover and union representation. Among those so treated were asbestos workers; however, in this group, those who were too weak to work due to asbestos-related diseases, took voluntary retirement, were sacked or died due to cancer or lung failure. This has given rise to the “healthy worker” effect that has distorted health statistics, invalidating the results of even new studies.

Poor training, as well as undermanning and general apathy, characterized the staff of the Employees’ State Insurance (ESI) scheme – a contributory health insurance scheme with large financial reserves. Consequently, ESI has been ineffective in supporting workers faced with occupa-

tional health problems. With little help from official bodies, workers have been confronted by information issues, including difficult access to the Internet owing to a shortage of resources, and the fact that all information tends to be in English (with some Latin and Greek). This has created serious difficulties for workers trying to obtain information on scientific, legal or insurance matters. These factors, as well as Kafkaesque “red tape-ism” (procedural delays), have daunted even the bravest of workers – armed with medical certification forms – seeking justice.

Acknowledgments: I wish to acknowledge Vasanthi Venkatesh for her inputs and proofreading the article. I also wish to acknowledge all the friends in the Occupational Health and Safety Centre, especially Malawadkar, Vijay, Surekha and Gnanesh for their inputs in writing of the article.



THE STRUGGLE BY MUMBAI ASBESTOS WORKERS FOR COMPENSATION

DR. RAKHAL GAITONDE AND MADHUMITA DUTTA

This paper is based on a series of meetings, interviews and visits in the city of Mumbai during the month of November 2007. We would like to extend our appreciation to the workers we met at this time who provided us with invaluable insights into the realities of working with asbestos and the suffering they have had to endure as a result of contracting incurable asbestos diseases:

Ravindra Ganpat Mohite
Sudhakar Raghunath Sawant
Arjun Nabaji Jadhav
Mr. Peje
Arjun Eknath Karanjavkar
Damodar Vittal Thakur
Ashok Pandurang Aher

Mumbai is a multi-dimensional megalopolis. It encompasses small streets and ancient architecture, middle class suburban housing, high-rise buildings along Marine drive and the obscenely conspicuous lifestyle of the rich and famous juxtaposed with the daily grinding struggle of the organized working class and the daily battle for mere survival of the unorganized and migrant worker. Here, one can sense hope, despair, dreams, frustration, resilience and death – all at the same time.

In November 2007, we met a group of former workers from the now closed Ghatkopar plant of Hindustan Composites Ltd., which used to produce numerous asbestos-based products. In a room full of workers diagnosed with asbestosis, an incurable and debilitating disease, hearing their stories, seeing the factory compound, now locked with paths overgrown with grass and weeds, in a long line of other old and dilapidated factories, with spanking new skyscrapers and mega malls occasionally springing up from old factory sites – it was a very different Mumbai that we were seeing. As we walked around Ghatkopar and later in Lower Parel with the workers, they pointed out all the factories that had closed down – asbestos, oxygen, pharmaceutical, textile – now either rotting or being replaced by the ugly monstrosities of vulgar exhibitionism that have come to signify “development” in India.

The overall mood amongst the workers was one of betrayal. As we talked and walked around, they kept pointing to things, the brakes on the trains, the roofs on the trains and buildings we passed, pipes: all made with asbestos – all made by them. They were in one “labored” breath proud of their contribution to the “development” but in the next bemoaned their fate, obviously upset about being let down by the very society to which they had contributed so much – all of them aware of the incurable disease they carried, for which there seemed no prospect of relief or compensation from either their former employers or the State.

The objective of the meetings in Mumbai was to document the struggle of the former workers to obtain compensation for asbestosis contracted by their exposure to

asbestos fibers when working at the Hindustan Composites factory. Although there is no scientific doubt about the cause and nature of asbestosis, and the law of the land is clear about rights of workers to compensation, for the past two years the workers have been waiting for a court hearing, with their lungs slowly failing them. Most of them had worked for more than 30 years at the factory and had never been warned about the hazards of asbestos. Safety at the factory, according to them, was never given any great importance. X-rays and lung function tests were conducted routinely every year, as stipulated under Indian labor laws, but not a single worker had ever received a medical report.

This story is compelling, especially in the context of the present reticence of the government to ban domestic production of asbestos products and its opposition to the inclusion of chrysotile on the PIC list of the Rotterdam Convention (a measure aimed at discouraging the export of hazardous materials like asbestos). It encapsulates the plight of the average Indian worker, the irresponsibility of corporate India, the ineffectiveness of regulatory authorities and the inertia of redressal mechanisms.

Asbestos in any context can cause harm, but when used under the conditions described by the Hindustan Composites workers its harmful effects are enhanced.

In the following sections we would like to establish the following points regarding the working conditions and legacy of disease experienced by workers at the Hindustan Composites plant:

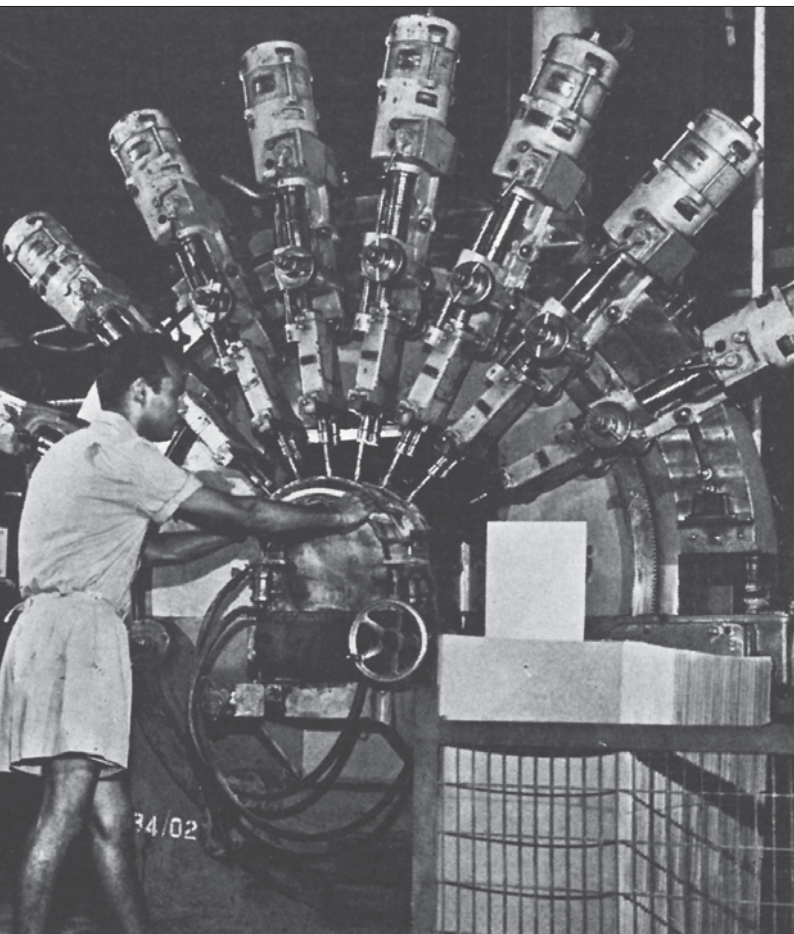
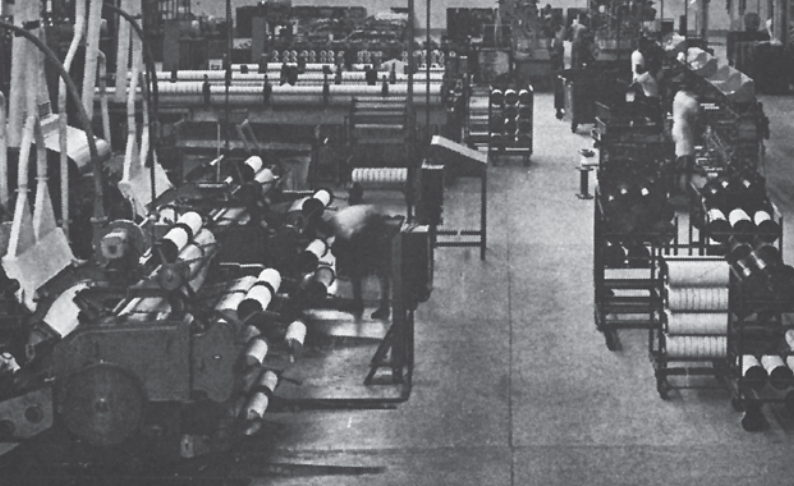
- ◆ Despite claims to the contrary, working with asbestos has resulted in significant health impacts – there were 41 confirmed cases of asbestosis from among 182 workers tested in 2004. Moreover, there is evidence of a number of cases of cancer – both confirmed and anecdotal – pointing to a huge burden of asbestos-related disease that remains to be properly documented.
- ◆ There was a total lack of adherence to safety norms at the factory. All the workers we interviewed, including some we met while walking around the vicinity of the factory, testified to the fact that they were never fully informed about the dangers of working with asbestos.
- ◆ Despite scientific clarity on the issue of causation of asbestosis as well as the law of the land being very clear as to the rights of the workers in cases of occupational injury, and despite all 41 of them getting certificates confirming a diagnosis of asbestosis from competent physicians, their attempt to assert their rights to compensation for health damages is turning into a protracted battle for justice.
- ◆ While there is some record of the permanent workers – so at least some potential to trace them – the plight of the contract laborers, used increasingly since the late



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Top: The machine-room floor at Asbestos, Magnesia & Friction Materials, Bombay.

Below: Drilling the rivet holes in a brake lining in one operation at the Ghatkopar, Bombay factory of Hindustan Ferodo.

*Turner & Newall Ltd: The first fifty years 1920-1970 (Manchester: T & N, 1970)

1980s, is shocking. Though they worked in dangerous environments similar to those experienced by the permanent workers – and many of them worked for years at the plant – they were never subjected to medical check-ups or any form of screening for asbestosis. Since there exists no record of their names or addresses, there can be no follow-up investigations. Hence we will never know the true extent of disease and disability among all those who worked in the factory.

Tracing the Corporate History

In 1949, a UK-based asbestos product giant, Turner & Newall (T&N), registered a company called Asbestos Magnesia and Friction Material (AMFM) sited in Sewri, Mumbai (then Bombay). In 1956, the company transferred to a new site in Ghatkopar in the northern part of Mumbai city, initially to produce asbestos textiles but later asbestos brake linings and other asbestos products. In 1964, the company was renamed Hindustan Ferodo, which in 1994 was to become Hindustan Composites Ltd.

Until 1994 the company remained part of the T&N group, with a large portion of shares owned by the Rasoi Group, an Indian business house headed by its chairman Raghu Mody. In 1994, the Rasoi Group bought out their British partners after a strike by workers in 1990 and arbitration over their Dearness (cost-of-living) Allowance (DA). Besides Hindustan Composites Ltd., the Rasoi Group owns Rasoi Ltd. and J.L. Morrison (India).

In addition to its first manufacturing unit in Ghatkopar, Hindustan Composites set up three more factories in Bhandara, Paithan and Jalna, all in Maharashtra, the latest in 2004. On August 2, 2006, the Ghatkopar factory was closed down after showing losses, which is denied by the ex-workers of the factory. The workers claim that production from the Ghatkopar factory has simply been shifted to the other three factories.

Hindustan Composites manufactures and supplies asbestos industrial products and friction materials to a wide range of core sector industries like the railway, engineering, mining, aerospace, steel, chemical, petrochemical, fertilizer, power generation, shipbuilding, atomic energy, electrical, oil exploration and automotive industries. According to the annual report of the company, the annual turnover increased by 8% in 2004-5 to Rs 602.5 million (US\$15.1 million) from Rs 555.9 million. In its Jalna plant, the company also manufactures asbestos-free disc brake pads and railway brake blocks.

The Ghatkopar Plant

According to the former workers, in 1978 there were about 2700 permanent workers employed in the Ghatkopar plant, which finally dwindled to 215 in 2006 at the time of its closure. From 1979 onwards, the company stopped recruiting permanent workers and instead hired contract workers on a rotational basis from time to time. At any given point of time from the early 1980s onwards there were about 150 or more contract workers in the plant. Companies normally hire contract workers, who are largely unorganized, to avoid having to provide the monetary and social benefits to which permanent workers are entitled, and to avoid li-

abilities. The Company's currently operational plants employ fewer workers than the Ghatkopar plant did when it was running.

The Company started offering a voluntary retirement scheme to permanent workers in the Ghatkopar plant from 1984-86 onwards, every two years. The permanent workers of what was then Hindustan Ferodo had the highest wages in the region until 1990. A strike called by their union at the time, the Centre for Indian Trade Union (affiliated with the Communist Party of India (Marxist)) resulted in a major loss and subsequent freezing of the workers' Dearness Allowance. Later an unjust DA scheme was worked out through arbitration, resulting in lower wages for the workers. Poor wages persisted till closure of the factory in 2006.

Knowledge about the Dangers of Asbestos

The workers we met universally reported that during their period of employment they were unaware of the dangers of asbestos. They claimed that the company never informed them explicitly of the dangers. One worker told us that it was his uncle, a teacher, who told him there was something "bad" about the factory and that he should be careful about his health. Admitting that there had been posters about the "danger" of asbestos, one of the workers argued: "Even if we did know about some of the dangers, we had no other option. This generation is not so educated that we could find other jobs, due to necessity we had to continue working, regardless of danger." Another worker said: "We knew something was wrong with asbestos, but nothing was clear and definite." In a tongue-in-cheek remark one of the workers offered: "Yes there were boards saying asbestos is dangerous, aren't there warnings even on cigarette packets, does it stop anybody?"

There may have been warnings about the dangers of asbestos on the bags or bales of raw asbestos coming from other countries, but as one worker explained: "the packing was in English, so no one could understand it". Even the doctor who gave them yearly check-ups would never tell them anything about asbestos or its dangers. When asked about the reason for the check-ups, or when patients started developing breathlessness and chest pain, the standard reply of the doctor would be: "Kuchh nahi hai" ("there is nothing").

Working Conditions

During the interviews and group discussion the workers gave detailed descriptions of their working conditions in the different sections of the factory. They also described the processes that were involved in the production of asbestos. The processes described were in the CAF (compressed asbestos fiber), textile (including carding, framing, plaiting and weaving) and BCL (brake and clutch lining) sections.

According to the workers, the most important sources of health problems were:

- ◆ The fine dust that was all pervasive in many areas.
- ◆ The 'compo' (a word they used for the varnish-solvent mixture used during some of the processes).
- ◆ Fire injuries, especially in the ovens and the "calendar" section.

Fine dust

The workers reported that there was always a "mist like cloud" of asbestos in working areas. They described the introduction of machines to suck out the dust at source, and the introduction of water during the weaving process. While these measures did reduce the amount of dust, there was still a fine mist present, especially in the areas where the asbestos was ground and cut. According to one of the workers, the suction machines produced 14-16 sacks of dust per shift (8 hrs). However, the workers estimated that this was only 60 to 70% of the total dust produced – the rest escaped the suction machines.

"Compo"

Many of the workers interviewed complained of "compo," a mixture of solvents and varnish. Inhaling this caused problems, including a feeling of breathlessness and tightness of the chest. The workers also complained of eye problems associated with the use of "compo".

Fire

There were instances of burn injuries, mainly involving ovens in various sections and in the carding section. The provision of fire extinguishers was one of the few safety inputs the workers remembered.

Safety Precautions

Regarding the safety precautions that were implemented in the factory, all the workers interviewed said that they were given only simple cotton masks. One of the workers who worked in the 1960s said that in the early days they were given respirators. However, the workers said that wearing respirators was extremely uncomfortable, especially in the hot and humid conditions in which they worked.

Symptoms Suffered by Workers in the Factory

Workers complained about having a lot of "kuph" (cough) throughout the working period. While not all the workers experienced acute symptoms, many of them complained about developing chest pain over the years (which detailed histories indicated to be respiratory rather than cardiac in origin). Workers also reported feelings of "thakaan" (tiredness) by the middle of a shift – especially toward the second and third decade of working in the factory, and tightness of the chest.

All of them said that during the first 15 to 20 years they did not feel anything untoward. The only symptoms early on were occasional periods of extreme tiredness, where they would just need to sit down for a while to recover. All of them talked about the initial years following their first bouts of breathlessness (now attributable to asbestosis). Invariably they consulted a family physician, who would prescribe a couple of days of symptomatic treatment; in those early years the symptoms would settle down temporarily and they would get on with life, until the next bout or until anxiety over their condition worsened.

Problems After Leaving the Factory

All of the workers whom we interviewed complained of increasing breathlessness over the previous 5-7 years, around 25 years since starting work at the factory. Many of the workers interviewed said that they had been using yoga to relieve the breathlessness.



Asbestos Olympics 2008

A consistent perception of the workers was of an increased death rate among people after having worked at the plant. As one worker put it, “*company chodne ke bad marlela hein*” (after leaving the factory, people die). At one of the group discussions, union members claimed that they had heard of around 40 individuals who had died of cancer since 1966. During the interviews, each worker was asked specifically if he knew of people from the factory who had developed cancer; as a result we were able to collect details of five former workers who had been diagnosed with cancer. Of course there would need to be a more detailed epidemiological study to estimate the exact cancer risk, but the perception was one of a high incidence of disease.

The death rate seemed to be high among all cohorts of workers who worked in the factory. When obtaining oral histories from the workers, mostly in their mid to late fifties, we asked:

“How many workers joined the factory with you in your section / worked in your section when you joined? Of them how many are alive today?”

The answers were very interesting, with most of the workers reporting at least 4-5 deaths among their batch of around 40 coworkers: nearly 100 per 1000 across all the cohorts. In a couple of instances slightly older workers talked of only 4 or 5 surviving in their cohort. While these are definitely very approximate figures, they are reflective of a situation that warrants urgent investigation.

Health Check-ups: A Mockery!

The workers we met consistently reported that although chest X-rays and medical examinations were performed every year, they were never told of the significance of these procedures or given the results. They told us that in the early days (1960s and 1970s) chest X-rays were done even every six months and for every one without fail, but as time went by, especially after the 1990s, the whole system became haphazard; if you were not present on the given day you might go without an X-ray for the entire year. It seems that the company was providing the X-ray facility to satisfy bureaucratic demands – not out of any genuine concern for the workers’ health.

One of the former workers said: "When I developed symptoms such as chest pain that used to come over the bases of my lungs, I went first to my family doctor who gave me symptomatic treatment. When I reported it to the company doctor he just dismissed it as nothing serious." A few workers did undergo diagnosis and some investigations at the Indian Institute of Technology in Mumbai (IIT- Powai), and the KEM hospital, but only a few patients went for the tests, and none of the other workers knew what significance the tests had or of any outcomes.

The workers reported that the company stopped the routine check-ups around 2003; the only check-up after that was arranged by the workers' union (as discussed below) and conducted by a team from the OHSC (Occupational Health and Safety Centre, Mumbai) in 2004. Thus the company did not provide any routine check-ups between 2003 and 2006, when the factory closed down.

The Regulatory Bodies

The workers were very dismissive of the regulatory authorities. They said that the authorities were totally in the camp of the company owners. Whenever the Factories Inspector was scheduled to come the whole factory would be cleaned up and masks distributed to everybody. However, in the words of one of the workers, "he would come outside the factory, take money outside itself and leave." Another worker recollected how when they came with a device to test the air concentration of asbestos – "they would perform the sampling at the canteen and main gate."

Attitude of the Company toward Compensation

The company's attitude toward compensation is reflected in the response of one of the workers who retired in 1998/9 and who subsequently developed throat cancer. This was diagnosed at the Tata Memorial Hospital. The doctor apparently asked him where he had worked. The patient told him that he had worked in an asbestos factory. The doctor then told him that that explained the cancer, and was prepared to give him a certificate stating as much so he could claim compensation. However, the retired worker declined the offer, saying that he "knew the company", and that a certificate would be of no use.

Even after the check-ups and diagnoses done by the OHSC, the company continued to deny the presence of any occupational disease in the workers; despite the fact that the OHSC team used standard diagnostic guidelines.

Liability

From November 8-12, 2004, members the Krantikari Kamgar Union (the union of the Hindustan Composites workers), encamped themselves outside the Ghatkopar plant and with the help of volunteers from the Occupational Health and Safety Centre, Mumbai conducted a medical survey.

Of the 232 workers in the factory, 181 participated in the survey – of these, 23% were diagnosed with asbestosis; all had worked at least 20 years at the plant.

Radiology showed that the majority of those diagnosed with asbestosis (83%) had parenchymal asbestosis alone

while 7% had "pleural asbestosis" (pleural thickening) alone. An additional 10% had both forms of the disease. Most of those with pleural disease complained of chest pain, while the majority with parenchymal asbestosis did not. Of course, in the case of diseases resulting from asbestos exposure, there is always the worry that chest pain may indicate malignancy and in fact two cases of pulmonary/pleural tumors were found among the workers tested.

In a paper based on the above survey* the authors express surprise at the "low" prevalence rate of asbestosis (23%) found in the workers examined: "Many studies reported a prevalence of above 70% among workers exposed to asbestos for more than 20 years." The authors explained the discrepancy as partly due to the fact that many affected workers would have been "forced to leave the company or to take voluntary retirement." Since these workers, particularly those who had been casually employed and likely to have done the most dangerous jobs, were largely untraceable or might have died, no figure for the true incidence of asbestosis at the plant could be obtained. An additional factor was that casual workers employed at the time of the survey would have been likely to risk losing their jobs, upon which their precarious livelihoods depended, by submitting themselves for testing. The shocking figure of 23% actually resulted from testing the "healthiest" workers.

After the survey, and with a list of 41 workers diagnosed with asbestosis, the Union approached the management of the company to demand compensation – first through verbal communications and then through letters dated December 8 and December 12, 2004. In a letter from Mr. Rajesh Tiwari, Works Manager, Hindustan Composites Limited, Ghatkopar plant to General Secretary, Krantikari Kamgar Union, dated December 17, 2004, the company responded:

"...the conclusions drawn by you, that workmen listed are affected by asbestosis are far fetched, not supported by sound medical inferences and are with certain motives.

...the company is following all the statutory regulation with regards to Health and Safety of the employees. The Company also follows the international norms as laid down by the Asbestos Information Centre, New Delhi, which are specific to our type of Industry. The company has qualified Medical Practitioners for regular health check-ups and maintains the records as per the rules and regulations laid down by the Directorate of Industrial Safety & Health."†

After failed attempts to get a positive response from the management, 36 workers diagnosed with asbestosis (out of the original 41) filed for compensation, under the Workmen's Compensation Act for health damages, before the Maharashtra Commissioner for Workmen's Compensation in December 2005. The total claimed was Rs4,453,127 (US\$111,328), with individual claims ranging from Rs33,391 (US\$834) to Rs316,680 (US\$7917) calculated on degrees of impairment as prescribed under Workmen's Compensation rules. The woefully small amount claimable is yet another injustice that has to be endured by workers incapacitated or facing an early death due to the criminal negligence of a company driven by profit making.

* Murlidhar V, Kanhere V. Asbestosis in an asbestos composite mill at Mumbai: A prevalence study. *Environ Health*. 2005; 4: 24. Online: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1289287>

† It is pertinent to recall, that in a BBC radio programme broadcast on October 14, 1993, Dr. James Allerdice, Turner & Newall's group medical officer, had said that the company could have done more to protect its overseas employees. He regretted that workers in India and Africa had died from asbestos-related diseases when knowledge and techniques were available which could have prevented these fatalities. Further, the BBC reporter, while researching the story, had witnessed horrendous asbestos exposures at T&N's subsidiary Hindustan Ferro Ltd. (Bombay), where primitive and dangerous conditions still existed (see: Kazan-Allen L. Asbestosis in India. *International Ban Asbestos Secretariat*. (2005) Online: http://ibasecretariat.org/ka_asb_india_11_05.php).

Response of the Judiciary

It is a disgrace that, in two years, only one worker, from the group that filed in December 2005, has been able to present his case to the Workmen's Compensation Commissioner – on June 13, 2007. The worker involved, Shri Ravindra Ganpat Mohite, is 50% incapacitated and is claiming Rs179,604 (US\$4490) compensation. Regrettably, the company lawyers have been successful in having the case adjourned at every hearing, and since September 2007, the post of "Compensation Commissioner" in the Workmen's Compensation court has been vacant. While the judiciary drags its feet over their cases the asbestos-injured workers are getting sicker and sicker by the day.

Conclusions

The 41 confirmed cases of asbestosis among the 182 workers evaluated by the OHSC team probably represent the tip of an iceberg. There were 2700 permanent workers originally working at the factory and who knows how many hundreds of contract workers employed there over the years. Our interviews with former workers revealed their impression that many workers died shortly after ceasing work at the plant, and certainly some of these died of malignant diseases. With no way of tracing ex-employees the scale of the tragedy cannot be accurately assessed, but

anecdotal evidence paints a grim picture – of a disaster in occupational health likely to be repeated at asbestos plants throughout India.

What is certain is that:

- ◆ Prolonged exposure to asbestos fibers at the levels experienced in Indian asbestos plants causes asbestosis; occasional exposure to far lower levels can cause the rapidly fatal malignancies: mesothelioma and asbestos-induced lung cancer.
- ◆ The management of the Ghatkopar factory was willfully negligent in the provision of a safe working environment – there were poor safety measures, no specific hazard briefings, totally inadequate protective equipment, poor control of dust levels, even allowing for the ridiculously high levels allowed by law in India.
- ◆ The management's failure to release the results of medical check-ups on their workers verges on the criminal, given that many of the X-rays so obtained would have revealed occupationally-caused disease.
- ◆ Regulatory bodies have been ineffective in ensuring safe working conditions for workers.
- ◆ Judicial processes are currently taking an inordinately long time.
- ◆ Levels of Workmen's Compensation are far too low in the context of a thriving national economy.

This monograph is not simply a muckraking tale of corporate malfeasance and government complicity although some may choose to interpret it as such. The contributions in this publication document a long-standing and total disregard for the consequences of industrialization and the accompanying corruption of a political system eager to accommodate the requirements of vested interests at the expense of workers and the poorer sectors of society. Although the focus of this report is on asbestos, the same practices and patterns of behavior can be discerned elsewhere in India's rapidly developing economy.

An expensive, multi-faceted campaign has been mounted by the asbestos sector to create a climate in which the use of its tainted products can flourish: a generous advertising budget has ensured that pro-asbestos infomercials and articles appear regularly throughout the media, corporate contributions to research projects buy access to government studies, retainers to high-powered lawyers affect the outcome of public interest litigation initiated by workers and at-risk communities and donations to electoral campaigns encourage politicians at local and national levels to do industry's bidding.

The marketing efforts of India's asbestos lobby are coordinated with those of other national stakeholders. Delegates

representing the Indian government have, on at least three occasions, helped to block efforts by the Rotterdam Convention to impose a modicum of regulation on the global trade in chrysotile asbestos. As we approach the October 2008 discussions of the Conference of the Parties to the Rotterdam Convention, there is little doubt about India's allegiance to the pro-asbestos faction that will, out of ruthless self-interest, veto efforts to include chrysotile on the Prior Informed Consent list. By exposing the Rotterdam Convention as a paper tiger, asbestos stakeholders will not only sound the death knell for a well-meaning multi-lateral agreement but also condemn millions of people to ill-health and premature death caused by avoidable exposures to a range of hazardous chemicals and pesticides.

Commerce without morality, science without humanity and politics without principle are amongst the deadly sins identified by the venerated Mahatma Gandhi. If, India is to keep faith with its own heritage, its citizens and populations throughout the developing world, it must become part of the solution and not the problem. Once the government has acknowledged the unacceptable hazard that asbestos poses and bans its use, the way is open for India to play a leading role in encouraging other nations in the region to do likewise. An asbestos-free future is possible!



Rocking the boat - Canadian masterclass

Appendix A

Asbestos-Related Diseases

Exposure to asbestos has been linked predominantly to three deadly diseases, characterized by extended latency periods:

Asbestosis results from the inhalation of asbestos fibers, usually over an extended period. It is an irreversible lung condition that progresses even after exposure to asbestos ceases. In cases of asbestosis, scar tissue stiffens and distorts the lungs, making breathing progressively more difficult; as the blood supply to the lungs becomes impaired, the heart is put under strain by the reduced efficiency of the lungs. The thickening of the alveoli (air sacs) caused by the action of the asbestos fibers reduces the uptake of oxygen and the discharge of carbon dioxide.

The higher the exposure, the greater the chances of developing asbestosis and the shorter the time it takes to develop. Asbestosis tends to be linked to heavy occupational exposure although cases of asbestosis among those not occupationally exposed, such as residents who lived near asbestos-using factories, have been known.

Malignant mesothelioma, once considered to be a rare tumor, has become increasingly more common. It is a cancer that usually arises on the outer surface of the lung (pleura), but can also occur in the lining of the abdominal cavity (peritoneum) and on rare occasions elsewhere.

There is a consensus that the commonest causal agent of mesothelioma is asbestos. Mesothelioma may occur in the absence of asbestosis and is associated with relatively low exposures to asbestos. It accounts for the majority of victims who contract an asbestos-related disease through environmental exposure and is a notoriously aggressive disease with no known cure.

Asbestos-related lung cancer

(bronchial carcinoma) can occur from occupational or environmental asbestos exposure; it is the predominant malignancy contracted by the asbestos-exposed. There is a powerful synergistic interaction between asbestos exposure and cigarette smoking in the induction of this condition. Compared to the lung cancer risk for a non-smoker with no occupational asbestos exposure, the risk for an asbestos worker who did not smoke is 5 times, for a smoker with no asbestos exposure it is 10 times, and for a smoker who worked with asbestos it is 55 times as great.

Appendix B

Production, Imports and Consumption of Asbestos in India, 1920-2006 (tonnes)¹

Year	Domestic Production	Imports	Consumption
1920	1,847		1,847
1930	34		34
1940	297	5,257	5,554
1950	211	10,957	11,160 ²
1960	1,711	21,967	23,652
1970	10,056	39,766	49,792
1975	20,312	41,514	61,826
1980	33,716	63,176	96,892
1985	29,450	78,075	107,525
1990	26,053	93,165	118,964
1995	23,844	91,909	115,739
1996	27,180	84,378	111,283
1997	25,537	83,356	108,611
1998	20,000	109,036	128,688
1999	21,000	115,220	136,048
2000	21,000	124,433	145,030
2001	21,000	130,291	150,161
2002	18,000	150,461	168,292
2003	19,000	175,581	192,033
2004	18,000	172,397	190,020
2005	19,000	236,494	255,205
2006	20,000	253,382 ³	272,856

for over 60 years, locally sourced asbestos has failed to meet national demands; since the 1940s, India has been amongst the top 4 asbestos consumers in Asia; since 1998, it has been the 2nd largest consumer (after China) in Asia; from 1970 to 2006, consumption increased nearly 5-fold; from 1998, annual consumption in India has increased, on average, by 9%, with the biggest increases, 14% and 34%, taking place in 2003 and 2005 respectively.

- 1 Data sourced from the United States Geological Survey (U.S.G.S.).
- 2 Asbestos exports from India are as follows: 1950: 8 tonnes (t), 1960: 26t, 1970: 30t, 1990: 254t, 1995: 14t, 1996: 275t, 1997: 282t, 1998: 348t, 1999: 172t, 2000: 403t, 2001: 1,129t, 2002: 169t, 2003: 2,548t, 2004: 377t, 2005: 288t, 2006: 526t = total 6,849t.
- 3 According to UN trade statistics, total chrysotile imports to India in 2006 were 306,427 tonnes, 21% higher than the U.S.G.S. figure.



Appendix C

Consumption of Asbestos in India, 1960-2006 (tonnes)⁴

Year	Consumption
1960	23,652
1961	26,266
1962	28,880
1963	31,494
1964	34,108
1965	36,722
1966	39,336
1967	41,950
1968	44,564
1969	47,178
1970	49,792
1971	52,199
1972	54,606
1973	57,012
1974	59,419
1975	61,826
1976	68,839
1977	75,852
1978	82,866
1979	89,879
1980	96,892
1981	99,019
1982	101,145
1983	103,272
1984	105,398
1985	107,525
1986	109,813
1987	112,101
1988	114,388
1989	116,676
1990	118,964
1991	118,319
1992	117,674
1993	117,029
1994	116,384
1995	115,739
1996	111,283
1997	108,611
1998	128,688
1999	136,048
2000	145,030
2001	150,161
2002	168,292
2003	192,033
2004	190,020
2005	255,205
2006	272,856
Total	4,825,025

- 4 Data sourced from the United States Geological Survey (U.S.G.S.) for the years 1960, 1970, 1980, 1990 and 1995-2006; figures for other years (before 1995) were estimated by assuming linear growth between the decadal values.

Appendix D

National Asbestos Bans and Restrictions⁵

Argentina
Australia
Austria
Belgium
Bulgaria
Chile
Croatia⁶
Cyprus
Czech Republic
Denmark
Egypt
Estonia
Finland
France
Gabon
Germany
Greece
Honduras
Hungary
Iceland
Ireland
Italy
Japan
Jordan
Korea⁷
Kuwait
Latvia
Lithuania
Luxembourg
Malta
Netherlands
Norway
Poland
Portugal
Saudi Arabia
Seychelles
Slovakia
Slovenia
South Africa
Spain
Sweden
Switzerland
United Kingdom
Uruguay

- 5 Exemptions for minor uses are permitted in some countries.
- 6 Croatia banned asbestos as of January 1, 2006. Six weeks later, the Ministry of Economy, under political and commercial pressure, forced the Ministry of Health to reverse its position with the result that the manufacture of asbestos-containing products for export was permitted again.
- 7 In February 2007, the Korean Labor Ministry announced that a national asbestos ban will take effect in 2009.

Appendix E

Useful Contacts

The International Ban Asbestos Secretariat, UK
website: <http://www.ibasecretariat.org>

The Building and Woodworkers International, Switzerland
website:
<http://www.bwint.org>

The International Metalworkers' Federation, Switzerland
website: <http://www.imfmetal.org>

The Asia Monitor Resource Centre, Hong Kong
website: <http://www.amrc.org.hk/>

The Asian Network for the Rights of Occupational Accident Victims
website: <http://www.anroav.org/>

Corporate Accountability Desk-The Other Media, India
contact: Madhumita Dutta,
email:
madhu.dutta@gmail.com

Ban Asbestos Network of India
contact: Gopal Krishna,
email:
krishnagreen@gmail.com

The Peoples Training and Research Centre, Baroda, India
Contact: Jagdish Patel,
email: jagdish.jb@gmail.com

Appendix F

Letter from Tata Memorial Hospital

	<p>TATA MEMORIAL CENTRE टाटा स्मारक केन्द्र TATA MEMORIAL HOSPITAL टाटा स्मारक अस्पताल</p>	<p>AA No 229498</p>
<p>12.06.2008</p> <p>Mr Prahlad Malvadkar A/3, Shramik Vasahat Hill Road, Kajupada Borivali (E) Mumbai - 400 066.</p> <p>Subject: Information under Right to Information Act 2005.</p> <p>Dear Sir,</p> <p>This is with reference to your letter dated 14th May 2008 asking information for the following:</p> <p>Q.1 Has Tata Memorial Hospital diagnosed and treated cases of Mesothelioma and lung cancer cases in last 40 years?</p> <p>A.1 Yes. Mesothelioma cases have been diagnosed and treated at Tata Memorial Hospital.</p> <p>Q.2 Details of all cases of Mesothelioma of Pleura and Peritoneum.</p> <p>A.2 Total 107 cases have been diagnosed as Mesothelioma since 1985 the details of which are enclosed.</p> <p>We do not have any history of these patients about their Asbestos exposure.</p> <p>TMH does not issue any certificate to patients about the causes for their disease.</p> <p>Thanking you,</p> <p>Yours sincerely,</p> <p> T. Anbumani Public Information Officer & Chief Administrative Officer</p>		
<p><small>Dr. E. Borges Mang. Patel Mumbai - 400 012, India Phone : 022-2417 7000 Fax : 022-2414 8537</small></p> <p><small>E-mail : medinal@tmcnet.in Website : http://tmh.gov.in/</small></p> <p><small>ॐ. ३. बोरिवली, मुंबई - ४०० ०६६, भारत फोन : ०२२-२४१७७००० फैक्स : ०२२-२४१४८५३७</small></p> <p><small>Cancer is curable, if detected early.</small></p> <p><small>आपका कर्करोग शीघ्र ही ठीक हो सकेगा।</small></p>		



Introduction

1. See: *Dumping Hazardous Waste in India: Toxic Ships* by Gopal Krishna, this monograph.
 2. Appendix A: *Asbestos-Related Diseases*.
 3. Appendix B: *Production, Imports and Consumption of Asbestos in India, 1920-2006*; Appendix C: *Cumulative Consumption of Asbestos in India, 1960-2006*.
 4. Several attempts to obtain data from the Indian Government on national asbestos production, exports and consumption have proved fruitless. We have therefore relied on statistics from the United States Geological Survey (U.S.G.S). These figures are sometimes revised by the U.S.G.S. when new data become available.
 5. In his paper *Difficulties in the Diagnosis of Asbestosis in India*, Dr. V. Murlidhar uses the adjectives "ineffective" and "Kafkaesque" to describe the operations of the ESIC.
 6. See papers by Jagdish Patel and Dr. Sudhakar Kamat, this monograph.
 7. Professor Amartya Sen says that: "one single factor, namely smoking... accounts for nearly one in 10 of all deaths in India." *India Facing Smoking Death Crisis*. BBC News. February 13, 2008. Website: <http://news.bbc.co.uk/1/hi/health/7239722.stm>
A study entitled *A Nationally Representative Case-Control Study of Smoking and Death in India*, published in the *New England Journal of Medicine* in February 2008, predicts that "in 2010, smoking will cause about 930,000 adult deaths in India... Because of population growth, the absolute number of deaths in this age group (30-69) is rising by about 3% per year."
 8. See: *Asbestos Multinationals in India: the Experience of Turner & Newall* by Geoffrey Tweedale, this monograph.
 9. Author unknown. *Rough Year Forecast for Asbestos Industry*. June 7, 1982. Globe and Mail.
 10. Appendix D: National Asbestos Bans.
 11. Canadian Government File A0001347_1-000082-84: *Chrysotile Briefing* by Louis Perron.
 12. Canadian Government File A0001338_1-000041: *Chrysotile Asbestos* by Louis Perron.
 13. Canadian Government File A0001342_1-000054: email from Louis Perron to Martin Barratt October 18, 2002.
 14. Canadian Government File A0001347_2-000083-84: *Chrysotile Asbestos* by Louis Perron.
 15. Kazan-Allen L. *Killing the Future – Asbestos Use in Asia*. IBAS 2007. See website: <http://www.ibasecretariat.org>
 16. Kazan-Allen L. *United Nations Supports Restrictions on Asbestos*. March 12, 2002. See website: <http://www.ibasecretariat.org>
 17. *The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade* was adopted in 1998 and came into force in 2004.
 18. According to Gopal Krishna of the Ban Asbestos Network of India, Brigadier Sethi of the Asbestos Information Centre and the Asbestos Cement Products Manufacturers Association was a member of the Indian delegation to COP3 making the Indian delegation the only one to have an industry representative as a member.
 19. Kazan-Allen L. *The Rotterdam Convention: Fighting for its Life*. March 19, 2008. <http://www.ibasecretariat.org>
 20. Answer to Question Q-232 asked by Mr. Martin (Winnipeg Centre).
 21. Wilkinson TL. *India Sees Trebling of Millionaires*. May 26, 2008. <http://www.efinancialnews.com/homepage/specialfeatures/2350705479/content/2450757315>
 22. Nanjappa V. *Delhi has most millionaires in India*. December 7, 2007. <http://www.rediff.com/money/2007/dec/07million.htm>
- Smoke and Mirrors:
Chrysotile Asbestos is Good for You
- Illusion and Confusion but not Fact**
1. Chrysotile Institute. Why so much emotion? The Asbestos Saga. Chrysotile Institute, Montreal (Quebec) Canada.
 2. International Alliance of Trade Unions "Chrysotile," 2007.
 3. International Alliance of Trade Unions "Chrysotile," 2007.
 4. Tyulkanova GM, 2007. Health must be taken care of. Trade Unions and Chrysotile, A Special Issue of the International Alliance of Trade Union Organizations "Chrysotile," April, p8.
 5. Nadrshina LI, 2007. Illness won't find us at home. Trade Unions and Chrysotile, A Special Issue of the International Alliance of Trade Union Organizations "Chrysotile," April, p7.
 6. Is Asbestos Killing 100,000 People Each Year? Chrysotile Institute, Montreal (Quebec) Canada.
 7. Lemen RA, 2006. Epidemiology of Asbestos-Related Diseases and the Knowledge that Led to What is Known Today. In: Asbestos Risk Assessment, Epidemiology, and Health Effects, Eds. RF Dodson, SP Hammar. CRC Taylor & Francis, 201-308.
 8. Smith AH, Wright CC, 1996. Chrysotile asbestos is the main cause of pleural mesothelioma. *Am J Ind Med*, 1998, Jan; 33(1): 94-96.
 9. Tyulkanova GM, 2007. Health must be taken care of. Trade Unions and Chrysotile, A Special Issue of the International Alliance of Trade Union Organizations "Chrysotile," April, p. 7; Is Asbestos Killing 100,000 People Each Year? Chrysotile Institute, Montreal (Quebec) Canada.
 10. CIS Countries Trade Unions' International Alliance "Chrysotile."
 11. Greenberg M, 2008. The defence of chrysotile, 1912-2007. *Int J Occup Environ Health*, Jan-Mar; 14(1): 57-66.
 12. Chrysotile Institute. Why so much emotion? The Asbestos Saga. Chrysotile Institute, Montreal (Quebec) Canada.
 13. Hodgson JT, Darton A, 2000. The quantitative risks of mesothelioma and lung cancer in relation to asbestos exposure. *Ann occup hyg*, 44(8): 565-601.
 14. Goodman M, Teta MJ, Hessel PA, Garabrant DH, Craven VA, Scrafford CG, Kelsh MA, 2004. Mesothelioma and lung cancer among motor vehicle mechanics: a meta-analysis. *Ann Occup Hyg*; 48(4); 309-326.
 15. Hernberg S, 1981. "Negative" results in cohort studies – How to recognize fallacies. *Scand J Work Environ Health*, 7: Suppl 4: 121-126.
 16. De Klerk NH; Musk AW, 2002. Epidemiology of mesothelioma. In: Mesothelioma, eds. BWS Robinson and AP Chahinian, Martin Dunitz, 339-349.
 17. Chrysotile Institute. Why so much emotion? The Asbestos Saga. Chrysotile Institute, Montreal (Quebec) Canada.
 18. Hodgson JT, Darton A, 2000. The quantitative risks of mesothelioma and lung cancer in relation to asbestos exposure. *Ann occup hyg*, 44(8): 565-601.
 19. USEPA, 1986. Airborne asbestos health assessment update. EPA/600/8-84/00F, Washington D.C.; Leigh J, Robinson BWS, 2002. The History of Mesothelioma in Australia 1945-2001. In: Mesothelioma ed. Bruce WS Robinson, A Phillippe Chahinian. Martin Dunitz; Stayner, LT, Dankovich, DA, Lemen, RA, 1996. Occupational Exposure to Chrysotile Asbestos and Cancer Risk: A Review of the Amphibole Hypothesis, *AJPH.*, Vol. 86, No. 2, pp. 179-186, February.
 20. Stayner, LT, Dankovich, DA, Lemen, RA, 1996. Occupational Exposure to Chrysotile Asbestos and Cancer Risk: A Review of the Amphibole Hypothesis, *AJPH.*, Vol. 86, No. 2, pp. 179-186, February.
 21. Mutsaers, SE. The mesothelial cell. *Int J Biochem Cell Biol*. 2004; Jan; 36: 1: 9-16.
 22. Suzuki, Y, Kolynema, N. Translocation of Inhaled Asbestos Fibers from the Lung to Other Tissues. *Am J Ind Med*. 1991; 19: 701-704; Kohyama, N, Suzuki, Y. Analysis of asbestos fibers in lung parenchyma, pleural plaques, and mesothelioma tissues of North American insulation workers. *Ann NY Acad Sci*. 1991; 643: 27-52.; Suzuki, Y Yuen, S, Ashley, R, Calderato, A. Asbestos fibers and human malignant mesothelioma. *Advances in the Prevention of Occupational Respiratory Diseases*, Eds. Chiyotani, K, Hooada, YI, Aizawa, Y., Elsevier Science B.V., 1998; 709-713; Sebastien, PI, Janson, X, Gausichet, A, Hirsch, A Bignon, J. Asbestos retention in human respiratory tissues: comparative measurements in lung parenchyma and in parietal pleura. *IARC Sci Pub*. 1980; 30: 237-246.
 23. Malorni, W, Losi, F, Falcini, M, Donelli, G. On the mechanism of cell internalization of chrysotile fibers. An immunocytochemical and ultrastructural study. *Environmental Research*. 1990; 52: 2: 164-177.
 24. Leversse, V, Renier, A, Fleury-Feith, J, Levy, F, Vivo, C, Pilatte, Y, Jaurand, M-C. Analysis of Cell Cycle Disruptions in Cultures of Rat Pleural Mesothelial Cells Exposed to Asbestos Fibers. *Am. J Respir Cell Mol Biol*. 1997; 17: 660-671.
 25. Selikoff IJ, Hammond EC, Seidman

- H, 1973. Cancer risk of insulation workers in the United States. Proceedings of the International Conference on the Biological Effects of Asbestos (Lyon), October 2-5, 1972; and see Howie RM, 2001. Letter to the Editor. Br Occupational Hygiene Society, Elsevier Sciences Ltd. Crown Copyright, 335.
26. Stayner LT, Kuempel E, Gilbert S, Hein M, Dement J, 2008. An epidemiologic study of the role of chrysotile asbestos fiber dimensions in determining respiratory disease risk in exposed workers. *Occup Environ Med* published online 20 Dec. 2007. doi: 10.1136/OEM.2007.035584.
27. WHO, ILO, IPCS, IARC, EPA. NIOSH, OSHA.
28. Pierce JS, McKinley MA, Paustenbach DJ, Finley BL, 2008. An evaluation of reported no-effect chrysotile asbestos exposures for lung cancer and mesothelioma. *Critical Reviews in Toxicology*, 38(3): 191-214.
29. ERG, 2003. Report of the peer consultation workshop to discuss a proposed protocol to assess asbestos-related risk. Eastern Research Group, Inc., Final Report, May 30. EPA Contract No. 68-C-98-148, Work Assignment 2003-05.
30. Selikoff IJ, Hammond EC, Seidman H, 1973. Cancer risk of insulation workers in the United States. Proceedings of the International Conference on the Biological Effects of Asbestos (Lyon), October 2-5, 1972.
31. Lacquet LM, van der Linden L, Lepoutre J, 1980. Roentgenographic lung changes, asbestosis and mortality in a Belgian asbestos-cement factory. *IARC Sci. Publ*, 30: 783-793; McDonald AD, Fry JS, Woolley AJ, McDonald JC, 1984. Dust exposure and mortality in an American chrysotile asbestos friction products plant. *Br J Ind Med*, 41(2): 151-157; Albin M, Jaksbsson K, Attewell R, Johansson L, Welinder H, 1990. Mortality and cancer morbidity in cohorts of asbestos cement workers and referents. *Br J Ind Med*, 47(9): 602-610; Piolatto G, Negri E, La Vecchia C, Pira E, Decarli A, Peto J, 1990. An update of cancer mortality among chrysotile asbestos miners in Balangero, northern Italy. *Br J Ind Med*, 47(12): 810-814.
32. Selikoff IJ, Hammond EC, Seidman H, 1973. Cancer risk of insulation workers in the United States. Proceedings of the International Conference on the Biological Effects of Asbestos (Lyon), October 2-5, 1972.
33. Chrysotile Institute. Why so much emotion? The Asbestos Saga. Chrysotile Institute, Montreal (Quebec) Canada.
34. WHO, 2006. Elimination of asbestos-related diseases. World Health Organization. Public Health and the Environment, WHO/SDE.OEH/06.03, September.
35. Chrysotile Institute, Montreal (Quebec) Canada.
36. ERG, 2003. Report of the peer consultation workshop to discuss a proposed protocol to assess asbestos-related risk. Eastern Research Group, Inc., Final Report, May 30. EPA Contract No. 68-C-98-148, Work Assignment 2003-05.
37. Stayner LT, Kuempel E, Gilbert S, Hein M, Dement J, 2008. An epidemiologic study of the role of chrysotile asbestos fiber dimensions in determining respiratory disease risk in exposed workers. *Occup Environ Med* published online 20 Dec. 2007. doi: 10.1136/OEM.2007.035584.
38. NIOSH, 2002. NIOSH Comments to DOL, June 27. National Institute for Occupational Safety and Health, US Department of Health and Human Services, Public Health Services, Centers for Disease Control and Prevention.

Abuse of Mass Media by Indian Asbestos Industry

1. LaDou J. The Asbestos Cancer Epidemic. *Environ Health Perspect*. 2004;112: 285-290.
2. Lilienfeld DE. The silence: the asbestos industry and early occupational cancer research – a case study. *Am J Public Health*. 1991;81:791-800.
3. Madhan G. Ramco Industries: Buy. *Financial Daily-The Hindu*. 2004 Oct 17.
4. Chrysotile Asbestos Cement Products Manufacturers' Association. Advertisement. *India Today*. 2002 Sep 2.
5. Chrysotile Asbestos Cement Products Manufacturers' Association. Advertisement. *Hindustan Times*. 2003 Jul 8.
6. Anonymous. Blast those myths about asbestos cement: a special feature. *The Indian Express*. 2003 Jul 15.
7. The Times of India. Asbestos cement – bubble of myths burst by facts: a Times special report. *The Times of India*. 2003 Nov 7.
8. Scientific findings squash asbestos cement myth at international conference. *The Indian Express*. 2004 Jan 24.
9. World Health Organization. Environmental health criteria 203: chrysotile asbestos. Geneva: WHO, 1998: 97-8.
10. International Agency for Research on Cancer. IARC monographs on the evaluation of carcinogenic risks to humans, Suppl 7. Lyon: IARC, 1987:106-16.
11. Landrigan PJ. Asbestos: still a carcinogen (editorial). *N Engl J Med*. 1998;338:1618-9.
12. Cullen MR. Chrysotile asbestos: enough is enough. *Lancet*. 1998;351:1377-8.
13. Chaturvedi S. Unpublished letters emailed and posted to The Editor, Indian Express sg@expressindia.com – 2003 Jul 18, Jul 24, Aug 5, and Nov 17.

14. Kazan-Allen L. Unpublished letter emailed to The Editor, Indian Express sg@expressindia.com – 2003 Aug 4.
15. Dutta M. It's time you opened your eyes to the truth. *The Indian Express*. 2003 Dec 11.
16. Tehelka bureau. The Return of Asbestos: With environmental norms in place, the uncertainty surrounding this industry recedes as companies plan to get out of the gloom. Tehelka. 2005 Feb [cited 2005 Mar 9]. Available from: http://www.tehelka.com/story_main10.asp?filename=Bu020505The.return.asp.

Health Hazards due to Asbestos Exposure in India

1. Murlidhar V, Kanhere V. Asbestosis in an asbestos composite mill at Mumbai: A prevalence study, *Environ Health*. 4:24 (2005).
2. Mansingha BK, Ranawat PS, Mineral economics and occupational health hazards of the asbestos resources of Rajasthan, *J Geol Soc (India)* 47: 375-382 (1996).
3. IPCS, International programme on chemical safety: environmental health criteria 46, 1985. *Guidelines for the Study of Genetic Effects in Human Population*, WHO Geneva. 25-54.
4. Lohani M, Dopp E, Weiss DG, Schiffmann D, Rahman Q. (2000); Kerosene soot induces genotoxicity and enhance the effect on co-exposure with chrysotile asbestos in Syrian Hamster Embryo Fibroblast; *Toxicol. Lett*. 114, 111-116.
5. Rahman Q, Dopp E, Lohani M, Schiffmann D. Occupational and Environmental factors enhancing the genotoxicity of asbestos. *Inhal. Toxicol*. 12, 157-163, (2000).
6. Rahman Q, Athar M. Asbestos-induced Carcinogenesis: An Update. *Advances in Biosciences*, 1994. (Review).
7. Schins RP, Mechanisms of genotoxicity of particles and fibers. *Inhal. Toxicol*. 14(1):57-78 (2002).
8. Lohani M, Becker H-H, Dopp E, Weiss DG, Schiffmann D, Rahman Q. (2002); Smoking Attenuates Asbestos-Induced numerical and structural Alterations of Chromosome 1 in Human Lymphocytes, A study using multicolor FISH with tandem labeling; *Toxicol. Letters*, 136, 55-63 (2002);
9. Dave SK, Beckett WS, Occupational asbestos exposure and predictable asbestos-related diseases in India. *Am J Ind Med*. 48(2):137-43 (2005).

Living with Asbestos: A Dangerous Existence

1. http://rbi.org.in/scripts/BS_PressReleaseDisplay.aspx?prid=18233
2. Construction Industry Development Council, India.
3. <http://www.indmedica.com/journals.php?journalid=7&issueid=80&action>

=editorial

4. Tushar Kant Joshi, Utpal B Bhuva, Priyanka Katoch (2006) Asbestos Ban in India: Challenges Ahead. *Annals of the New York Academy of Sciences* 1076 (1), 292-308.
5. Building and Wood Workers International (BWI) is a Global Union Federation representing about 350 trade unions in the building, construction, wood and forestry sector from 135 countries and with a membership base of around 12 million.

Potential Health Hazards of Asbestos Cement Roofing for India's Poor

1. Personal communications with Colleen Samuel, Founder and Director of Divya Shanthi Christian Association and Trust, May 10, 2006 and Divya Shanthi Staff, July 29, 2006. Formed in 1967, Divya Shanthi aims to give hope to the poor through a holistic, relational approach which includes programmes in education, medical care, social work, micro-finance and spiritual development. "Divya Shanthi programmes reach 8000 to 10000 families in North Bangalore city and surrounding villages." They also operate in Tamil Nadu in three villages affected by the 2004 tsunami (Divya Shanthi Christian Association and Trust, *Give HOPE*, Brochure, Undated (after 2002), India.
2. Researcher, Site Visits, January 18 and February 8, 2006.
3. Krishna, G., 2004 *White asbestos: Silent Killer*, Toxic Tours XVII. Online: <http://www.infochangeindia.org/toxictours17.jsp>
4. Researcher, Site Visit, February 8, 2006.
5. February 3rd, 2006.
6. Oxford City Council, 2006; DoH, 2003; OSH, AC Products, 1998; MoH, 1996.
7. 2001:3.
8. Landrigan and Soffritti, 2005:473.
9. Agarwal, 2004:2 (Researcher's emphasis).
10. Rai, Zee News, February 7, 2006:Online.
11. Vogel, personal communication, May 31, 2006; Krishna, Toxics Link, January 24, 2004:Online; *AbsoluteEnergy Ltd.*, 2004:1; MoH, N.Z., 1996:8; DoH, W.A., 2003.
12. 2005:Online.
13. Dyczek, 2004.
14. *ibid*.
15. Krishna, Toxics Link, January 7, 2005:Online; Joshi and Gupta, 2003:251.
16. Professor and Head of Department at an Indian medical college, name withheld, personal communication, February 20, 2006.
17. Krishna, Toxics Link, June 5, 2004:Online.
18. LHC, Chapter 3, 1995:Online.
19. citing the 1983, U.S. Consumer Product Safety Commission, *ibid*.

20. *ibid.*
21. Vogel, 2005:7; Hurè, 2004:1; Joshi, 2003:249.
22. Dutta and Sreedhar, 2003:254.
23. Santè Solidarités, 1998:8.1.
24. *ibid.*:8.2.1-2.
25. Bohme et. al., 2005; Jacobson, 2005; Gennaro et. al., 2005; EWG, 2004:10-24.
26. Landrigan and Soffritti, 2005:472.
27. Website, JHMRF, 2006:Online; EWG, 2004:11.
28. Glater, NYT, October 9, 2005:Online; Brickman, 2004.
29. EWG, 2004:10-14.
30. International Metalworkers Federation, 2004:Online.
31. Kazan-Allen, citing Ushijima, GAC, 2004:36.
32. EWG, 2004:7.
33. Kazan-Allen, 2005a:Online; Centre for Science and Environment, 2000:Online; personal communications: T. Joshi, June 18, 2006; G. Krishna, June 9, 2006; J. Patel, May 31, 2006.
34. UNEP 2005:56.
35. Santè Solidarités, 1998: 8.2.1-3.
36. NEDLAC, 2002:108.
37. Eternit Akmene, Undated:Online; Gibson, 2004; NEDLAC, 2002.
- Bibliography:**
- AbsoluteEnergy Limited*, 2004, *AbsoluteEnergy Policy for Insulating Asbestos Clad Roofs*, Nelson, New Zealand: *AbsoluteEnergy Limited*.
- Agarwal, R., 2004, Looking away from a deadly killer! in *Toxics Dispatch*, Toxics Link Newsletter, 24, 2. Online: http://www.toxicslink.org/docs/06053_toxics_dispatch_december_2004.pdf
- Aranovus, 2006, Aranovus asbestos roof refurbishment, in *Buildingtalk*, News Release, April 5. Online: <http://www.buildingtalk.com/news/ara/ara101.html>
- Aranovus, 2005, Refurbishing asbestos cement roofs, in *Buildingtalk*, News Release, March 17. Online: <http://www.buildingtalk.com/news/ara/ara100.html>
- Bohme, S.R., Zorabedian, J. and Egilman, D.S., 2005, Maximizing Profit and Endangering Health: Corporate Strategies to Avoid Litigation and Regulation, in *International Journal of Occupational and Environmental Health*, 11 (4) 338-348. Online: <http://www.ijoeoh.com/index.php/ijoeoh/issue/view/26>
- Brickman, L., 2004, On the Theory Class Theories of Asbestos Litigation: The Disconnect Between Scholarship and Reality, in *Pepperdine Law Review*, Abstract, 31 (33). Online: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=490682
- Centre for Science and Environment, 2000, Death Inside The Factory Gates, in *Down To Earth*, 9 (9) 38-41. Online: http://www.ban.org/Library/dte_analy1.html
- Department of Health, 2003, *Environmental Health Guide: Asbestos Cement Products In Your Home*, Western Australia: Environmental Health Directorate, Population Health Division, Department of Health, Government of Western Australia. Online: http://www.population.health.wa.gov.au/environmental/resources/asbestos_cement_products.pdf
- Dhillon, G.S., 2002, Novel wood substitutes, in *The Tribune Online Edition*, May 9. Online: <http://www.tribuneindia.com/2002/20020509/science.htm>
- Divya Shanthi Christian Association, 2005, *Family Helper Project Annual Review Report*, April 2004 to March 2005, Bangalore.
- Dopp, E., Yadav, S., Ahmad Ansari, F., Bhattacharya, K., von Recklinghausen, U., Rödelsperger, K., Shokouhi, B., Geh, S. and Rahman, Q., 2005, ROS-mediated genotoxicity of asbestos-cement in mammalian lung cells *in vitro*, in *Particle and Fibre Toxicology*, 2 (9). Online: <http://www.particleandfibretoxicology.com/content/pdf/1743-8977-2-9.pdf>
- Dutta, M. and Sreedhar, R., 2003, The Blighted Hills of Roro, Jharkhand, India: A Tale of Corporate Greed and Abandonment, in *International Journal for Occupational and Environmental Health*, 9 (3) 254-259. Online: <http://www.ijoeoh.com/index.php/ijoeoh/issue/view/12>
- Dyzek, J., 2004, Surface of Asbestos-Cement (AC) Roof Sheets and Assessment of Risk of Asbestos Release. In *Global Asbestos Congress (GAC 2004)*, November 19-21, Tokyo, Japan: International Ban Asbestos Secretariat.
- Environmental Working Group, 2004, *Asbestos Litigation Reform Reconsidered*, Environmental Working Group. Online: <http://www.ewg.org/reports/printerfriendly.php>
- Eternit Akmene, Joint Stock Company, Undated (after 2001), *Reorganisation of the Slating Line from P5 Format Curly Sheet to CB40 Format Asbestos-Free Curly Sheet Line*, Case Study. Online: <http://virtual.vtt.fi/virtual/constrinnet/material/final%20report/cases/013%20lihtuanian%20eternit%20akmene.pdf>
- Gennaro, V. and Tomatis, L., 2005, Business Bias: How Epidemiologic Studies May Underestimate or Fail to Detect Increased Risks of Cancer and Other Diseases, in *International Journal of Occupational and Environmental Health*, 11 (4) 356-359. Online: <http://www.ijoeoh.com/index.php/ijoeoh/issue/view/26>
- Gibson, B., 2004, A Practical Approach to Asbestos Management. In *South African Institute for Occupational Hygiene Conference*, March 10, Mabalingwe. Online: www.saioh.org/SAIOH04/Asbestos1.pdf
- Glater, J.D., 2005, The Tort Wars, at a Turning Point, in *The New York Times*, October 9. Online: <http://www.nytimes.com/2005/10/09/business/09tort.html>
- Hurè, P., 2004, *Respiratory diseases linked to exposure to products such as asbestos: Are preventive measures sufficient?* Report, September. Online: <http://www.hesa.etui-rehs.org/uk/dossiers/files/hur%C3%A9-asbestos.pdf>
- International Labour Organisation, 2006, *International Labour Conference Provisional Record Ninety-fifth Session: Report Of The Finance Committee Of Government Representatives*, Nineteenth and Twentieth Sittings, June 14, Geneva:ILO. Online: <http://www.ilo.org/public/english/standards/relm/ilc/ilc95/pdf/pr-23.pdf>
- International Metalworkers Federation, 2004, James Hardie about-faces, in *International Metalworkers Federation News*, August 30. Online: <http://www.imfmetal.org/main/index.cfm?n=47&l=2&c=9605>
- Jacobson, M.F, 2005, Lifting the Veil of Secrecy from Industry Funding of Nonprofit Health Organizations, in *International Journal of Occupational and Environmental Health*, 11 (4) 349-355. Online: <http://www.ijoeoh.com/index.php/ijoeoh/issue/view/26>
- Joshi, T.K. and Gupta, R.K., 2003, Asbestos-related Morbidity in India, in *International Journal of Occupational and Environmental Health*, 9 (3) 249-253. Online: <http://www.ijoeoh.com/index.php/ijoeoh/issue/view/12>
- Kazan-Allen, L., 2005, *Asbestosis In India*, International Ban Asbestos Secretariat, November 8. Online: http://www.ibasecretariat.org/lka_asb_india_11_05.php
- Kazan-Allen, L., 2005, *Global Asbestos Congress (GAC 2004)*, Report of proceedings, November 19-21, 2004, Tokyo, Japan: International Ban Asbestos Secretariat. Online: http://www.ibasecretariat.org/lka_gac_2004_online_report.php
- Krishna, G., 2006, Plight of Asbestos Victims in India, in *Independent Media Centre India*, January 6. Online: <http://www.india.indymedia.org/en/2006/01/211307.shtml>
- Krishna, G., 2005, Environmental groups seek urgent ban on white asbestos, in *Toxics Link*, Press Release, January 7. Online: <http://www.toxicslink.org/mediapr-view.php?pressrelnum=17>
- Krishna, G., 2004, Environmental groups warn of asbestos epidemic, call for its ban, in *Toxics Link*, Press Release, June 5. Online: <http://www.toxicslink.org/mediapr-view.php?pressrelnum=12>
- Krishna, G., 2004, Alternatives to asbestos, in *Toxics Link*, January 24. Online: <http://www.toxicslink.org/art-view.php?id=12>
- Landrigan, P.J. and Soffritti, M., 2005, Collegium Ramazzini Call for an International Ban on Asbestos, in *American Journal of Industrial Medicine*, 47, 471-474. Online: <http://hesa.etui-rehs.org/uk/dossiers/files/AsbestosBan2005.pdf>
- London Hazards Centre, 1995, *Asbestos Hazards Handbook*, London: London Hazards Centre. Online: <http://www.lhc.org.uk/members/pubs/books/asbestos/ash-toc.htm>
- Ministry of Health, 1996, *All About Asbestos*, New Zealand: Ministry of Health. Online: <http://www.healthed.govt.nz/upload/PDF/7021.pdf>
- National Economic Development & Labour Council, 2002, *The socio-economic impact of the phasing out of Asbestos in South Africa: A Study undertaken for the Fund for Research into Industrial Development, Growth and Equity (FRIDGE)*, South Africa: National Economic Development & Labour Council. Online: <http://www.nedlac.org.za/>
- Occupational and Environmental Diseases Association, 2006, *Asbestos In your home*, OEDA Leaflet.
- Occupational Safety and Health, 1998, *A Guide to Working with Asbestos-Cement Products*, Wellington, New Zealand: Department of Labour. Online: <http://www.osh.dol.govt.nz/order/catalogue/pdfs/asb003.pdf>
- Oxford City Council, 2006, *Asbestos: Preventing a Health Hazard in Your Home*, Oxford Building Solutions Leaflet, Oxford: Oxford City Council.
- Rahman, Q., Vetteshirm, P., Smith, K.R., Seth, P.K. and Selkirk, J., 2001, *International Conference on Environmental and Occupational Lung Diseases: Meeting Reports*, April. Online: <http://www.ehp.niehs.nih.gov/docs/2001/109p425-431>
- Rai, I., 2006, Asbestos: The Magic Mineral No One Wants except India, in *Zeenews.com*, February 7. Online: <http://www.zeenews.com/znnew/articles.asp?aid=269268&sid=ZNS>
- Ruskulis, O., 1996, Technical Brief: Micro-Concrete Roofing Tile Production, in *Appropriate Technology*, 23 (1) ATBrief 16. Online: http://www.itdg.org/docs/technical_information_service/microconcrete_roofing_tiles.pdf
- Santè Solidarités, 1998, *Chrysotile Asbestos: Environmental Health Criteria 203 International Programme On Chemical Safety (IPCS)*, Organisation

Mondiale de la Santé. Online: <http://www.sante.gouv.fr/amiante/connaître/sciences/rapportc1.htm>

Stayner, L.T., Dankovic, D.A. and Lemen, R.A., 1996, Occupational Exposure to Chrysotile Asbestos and Cancer Risk: A Review of the Amphibole Hypothesis, in *American Journal of Public Health*, 86 (2) 107-114. Online: <http://www.cdc.gov/niosh/pdfs/97-162-d.pdf>

United Nations Environment Programme, 2005, *Sri Lanka Post Tsunami Environmental Assessment*, UNEP and Ministry of Environment and Natural Resources of Sri Lanka. Online: http://www.unep.org/tsunami/reports/Sri_Lanka_Report_2005.pdf

Vogel, L., 2005, Asbestos in the world, in *HESA Newsletter*, The Health and Safety Department of the European Trade Union Institute: Research, Education, Health and Safety, 27, 7-21. Online: <http://hesa.etui-rehs.org/uk/newsletter/files/Newsletter27p7-21.pdf>

Website, 2006, *June Hancock Mesothelioma Research Fund*. Online: <http://www.leeds.ac.uk/meso/>

Asbestos Multinationals in India

1. R. Turner to Rooksby, June 1, 1937. All documents cited below are from the T&N archive.
2. H.W. Phillips to Mulund Works manager, January 31, 1938.
3. R. Turner to Rooksby, March 14, 1938.
4. Hardie to W.P. Howard, March 1, 1966.
5. See G. Tweedale and Jock McCulloch, *Defending the Indefensible: The Global Asbestos Industry and Its Fight for Survival* (Oxford: OUP, 2008); and J. Jayaratnam, The Transfer of Hazardous Industries, *Journal of Society of Occupational Medicine* 40 (1990), pp. 123-6.
6. Raines's Report on International Conference of Asbestos Information Bodies, 1971, to F.J. Solon, December 10, 1971.
7. Lewinsohn, Report on a Visit to India, November 1, 1975-November 15, 1975.
8. A.L. Rickards, Hindustan Ferodo Ltd: Visit on October 30, 1978.
9. J.T. Allardice, Letter re. Visit to India, November 10, 1979-November 21, 1979.
10. Hardie to T&N directors, April 16, 1981.
11. Yorkshire TV, Alice – A Fight for Life, July 20, 1982.
12. Richard A. Wells (T&N director), Notes on a Visit to Hindustan Ferodo, October 20/24, 1982.
13. Face the Facts, BBC Radio 4, October 13, 1993.

The Struggle against Asbestos-Related Diseases in Gujarat

1. Gujarat State Gazette, Part I, June 1989.
2. *ibid.*
3. *ibid.*
4. Report of the Committee to Study Health Hazards in Asbestos Industry.
5. Petition submitted by CERC, Ahmedabad in Supreme Court of India, 1986.
6. Bob Wyrick. Asbestos Plant threatens a village in India. Part IV of Hazards for Export, Newsday.
7. Barry Castleman. Industrial Hazards Exported to India. *Economic and Political Weekly (India)*, June 1981.
8. Rejoinder submitted by CERS in Supreme Court and interview with Rani Advani, the author took in 1990.
9. Castleman B. India: Asbestos Update. (2002): http://www.ibasecretariat.org/bc_india_asb_update.php
10. Letter to Chief Inspector of Factories from Ahmedabad Elect. Company. June 19, 1995.
11. *Mazdhanr men Jivan: Alang Aur Chatgaan men Shipbreaking Udyog*-Greenpeace/HIDH Publication. 2007 (Hindi).
12. Written information given by ESIC under Right to Information Act. 2005.

"Monitoring" Environmental Pollution and Asbestos Exposure in Gujarat

1. Hirway, I. and D. Mahadevia. 2004. Gujarat Human Development Report, 2004. Mahatma Gandhi Labour Institute, Ahmedabad.
2. Dupont, V. 2005. Peri-Urban Dynamics: Population, Habitat and Environment on the Peripheries of Large Indian Metropolises: An Introduction in Dupont, V. (eds.), *Peri-Urban Dynamics: Population, Habitat and Environment on the Peripheries of Large Indian Metropolises: A Review of Concepts and General Issues*. CHS Occasional Paper No. 14. French Research Institutes India.
3. Joshi, T.K., Bhuvu, U.B and P. Katoch. 2006. Asbestos Ban in India: Challenges Ahead, *Annals New York Academy of Sciences*, Vol. 1026: 292-308.
4. National Institute of Occupational Health 1997. A Report on Assessment of Ambient Air Pollutants in Vicinity of Gujarat Composite Limited, Ahmedabad.
5. Pancholi 1997. "Comments of the expert on the report submitted by NIOH: In special civil application no.8617 of 1997 in the matter of environmental pollution with respect to Shri Digvijay Cement Co. Ltd."
6. Lipschutz, R. 2004. "Global Civil Society and Global Governmentality: or, the Search for Politics and the State amidst the Capillaries of Social Power." Barnett, M. and R. Duvall (eds.) *Power in Global Governance*. Cambridge University Press, Cambridge.

Difficulties in the Diagnosis of Asbestosis in India

Bibliography:

1. Aberle, D. R., G. Gamsu, et al. (1988). High-resolution CT of benign asbestos related diseases: clinical and radiographic correlation. *Am J Roentgenol* 151: 883 - 891.
2. American Thoracic, S. (2004). Diagnosis and Initial Management of Nonmalignant Diseases Related to Asbestos. *Am J Respir Crit Care Med* 170: 691 - 715.
3. Braunwald, E. (2001). *Harrison's Principles of Internal Medicine*.
4. Duesberg, P., R. Li, et al. (2005). The Chromosomal Basis of Cancer. *Cellular Oncology* 27: 293-318
5. Genevois, P. A., P. De Vuyst, et al. (1994). Conventional and high-resolution CT in asymptomatic asbestos-exposed workers. *Acta Radiol* 35: 226 - 229.
6. International Labour, O. (2003). *International Classification of Radiographs of Pneumoconioses*.
7. Markowitz, S. B., A. Marabia, et al. (1997). Clinical predictors of mortality from asbestosis in the North American Insulator Cohort. *Am J Respir Crit Care Med* 156: 101 - 108.
8. Mudur, G. (2003). Asbestos poisoning was covered up by doctors, claims health team. *BMJ* 327: 248.
9. Murlidhar, V. (2002). Occupational diseases among textile workers of Mumbai. *Natl Med J India* 15: 181.
10. Murlidhar, V. (2002). Occupational health physicians: unwilling or unable to practise ethically. *Indian Journal of Medical ethics* 10: 26.
11. Murlidhar, V. (2005). Demystifying Occupational and Environmental Health: Experience from India. *Science and Citizens: Globalization and the Challenge of Engagement*. M. Leach, I. Scoones and B. Wynne. London, UK, Zed Books: 130-141.
12. Murlidhar, V. and V. Kanhere (1998). Occupational noise-induced hearing loss: the first two cases compensated in India. *Natl Med J India* 11: 150.
13. Murlidhar, V. and V. Kanhere (2005). Asbestosis in an asbestos composite mill at Mumbai: A prevalence study. *Environ Health* 4(1): 24.
14. Murlidhar, V., V. Murlidhar, et al. (1995). Byssinosis in a Bombay textile mill. *Natl Med J India* 8: 204-207.
15. Murlidhar, V., V. Murlidhar, et al. (2005). Evaluation of Impairments and Disabilities.
16. Murlidhar, V., V. J. Murlidhar, et al. (1995). Byssinosis in a Bombay textile mill. *Natl Med J India* 8(5): 204-7.
17. Weinberg, R. A. and W. C. Hann (2002). Rules for making Human Tumour Cells. *New England Journal of Medicine* 347(20): 1593-1603.



India's Asbestos Time Bomb

Although asbestos, an acknowledged carcinogen, is banned by developed countries, consumption is growing in India. The damage to human health and the pollution of the environment caused by the use of 7 million tonnes of this toxic substance have remained unacknowledged by a government obsessed with the quest for economic development.

In the absence of official action, concerned citizens in India work to assist the injured and raise awareness of the asbestos hazard. This publication gives campaigners the opportunity to document their experiences and, in conjunction with international experts, highlight the measures needed to deal with the country's asbestos legacy. The contributing authors are unanimous in their belief that the use of asbestos must be banned in India.