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Asbestos in Thailand

Introduction

In Thailand, asbestos has been imported for more than 30 years. It is used in several industries throughout the country. For example, 90 % of imported raw materials are used in cement manufacture, i.e., roof tile and cement pipe. The others are found in production of brake and clutch (8 %) and in production of vinyl floor tile, gasket, or heat insulating materials (2 %). In 2001, 17 asbestos-use factories with 1,710 workers were registered at the Department of Industrial Work, Ministry of Industry. These are one of the high-risk groups for occupational asbestos-related diseases in the country. At least three government agencies have a major role in controlling of asbestos. The Department of Industrial Work regulates and controls import, use, and storage of asbestos. As very highly toxic chemical, crocidolite has been banned under the Hazardous Substance Act B.E. 2535. In addition, asbestos is also regulated under the Labour Protection Law of the Ministry of Labour. The legislation indicates an occupational exposure standard level for asbestos in order to protect workers' health.

Asbestosis is one of eight occupational diseases under an active health surveillance scheme run by the Department of Industrial Work, which has been established for more than 10 years. However, most of the tasks are focused on silicosis and lead poisoning because of higher target population. Therefore, very little information is available from the surveillance system.

Production and use

Since there are no asbestos mines in Thailand, it is only imported for manufacturing purpose from several countries. Moreover, only chrysotile and amosite are allowed to use in the country. Nowadays, the trend of imported raw materials, especially chrysotile, is increasing. The data from Thai Customs Department showed that the number increased from 90,700 t in 1987 to 120,147 t in 2001. The most imported quantity of asbestos in 1997 was from Canada, followed by Russian Federation and Greece as shown in table 1 [1].

Country	Quantity (kg)
Botswana	2,140,000
Brazil	7,530,000
Canada	(1) 79,820,894
China	2,847,500

Country	Quantity (kg)
Greece	(3) 22,334,000
Japan	260,002
Kazakhstan	1,505,000
Kyrgyzstan	215,000
Russian Federation	(2) 38,575,662
South Africa	324,250
Spain	1
Switzerland	336,825
United Kingdom	540,000
USA	2,595
Zambia	918,000
Zimbabwe	19,774,000
Total	**177,123,729**

Table 1: The quantity of asbestos imported in 1997 (Source: Thai Customs Department, Import & Export Statistics, 1997).

Exposure measurements

Environmental investigation together with health examination in asbestos-use factories were firstly carried out by a former organization of the Bureau of Occupational and Environmental Diseases in 1987. The results of air sampling and analysis for asbestos in working environment were reported that 4 out of 20 investigated factories had asbestos in working environment above the American Conference of Industrial Hygienists (ACGIH) Threshold Limit Value (ACGIH TLV, 1986-87) for chrysotile (2 fibers/cm^3). Brake and clutch factories, especially in mixing process, were found to have highest concentration of asbestos compared to other factory types. Table 2 shows concentration of asbestos in working environment investigated in 20 factories during 1987-88 [2, 3]. Both, area air sampling and personal air sampling were taken in the investigation. It was found that roof tile, vinyl floor tile and cement pipe factories were large scale factories with good manufacturing practice and engineering control. However, most brake and clutch factories were small scale enterprises that had inadequate engineering control together with poor safety management and practice. It was recognized that to give technical recommendations on safe use of asbestos, ACGIH TLV of 2 fibers/cm^3

was suggested as a criterion level to asbestos-use factories even though Thai labour law regulates at 5 fibers/cm^3.

Factory Type	Num-bers	Asbestos in area samples (fiber/cm^3)		Asbestos in personal samples (fiber/cm^3)	
		1987	1988	1987	1988
1. Roof tile	7	0.00 – 0.68 (0.10±0.14)	0.00 – 12.00* (0.51±2.39)	0.00 – 1.11 (0.18±0.29)	0.00 – 0.75 (0.14±0.21)
2. Cement pipe	2	0.00 – 0.34 (0.13±0.13)	0.12	0.12 – 2.13* (1.33±0.91)	0.25
3. Vinyl floor tile	1	0.00 – 0.29 (0.04±0.08)	0	0.00 – 0.18 (0.04±0.07)	0
4. Asphalt undercoat and acrylic paints	3	0.00 – 0.08 (0.03±0.03)	0.00 – 0.58 (0.09±0.23)	0.00 – 0.06 (0.03±0.03)	0.48
5. Brake and clutch	7	0.00 – 9.26* (1.20±2.06)	0.00 – 4.44* (0.56±0.90)	0.01 – 58.46* (3.06±10.12)	0.00 – 3.73* (0.81±0.96)

Table 2: Asbestos concentration in working environment of 20 factories investigated by Division of Occupational Health, 1987–88. *Note:* *above than ACGIH TLVs (1986-87) for chrysotile which was 2 fibers/cm^3; mean±SD in blanket.

In addition, two asbestos exposure investigations were carried out by:

1. National Institute for the Improvement of Working Conditions and Environment (NICE) in 2000 by using NIOSH method #7400 for air sampling and fiber counting technique [4], and
2. Department of Industrial Works in 2001 by following WHO recommended method (1997, [5]).

The results were concluded in table 3 showing that working in brake and clutch factories, especially in mixing and cold-press in brake production process, had higher risk of asbestos-related disease than the other. This results confirmed the former investigations.

Factory type	Year 2000		Year 2001	
	numbers	Asbestos concentration (fiber/cm^3)	numbers	Asbestos concentration (fiber/cm^3)
1. Roof tile and pipe	4	0.01 – 2.2* (0.81±0.72)	4	0.01 – 0.77 (0.09±0.21)
2. Brake	5	0.24 – 43.31* (6.93±8.19)	25	0.01 – 25.71* (1.07±3.11)
3. Clutch	2	0.62 – 2.41* (1.45±0.65)		

Table 3: Asbestos concentration in working environment investigated by NICE in 2000 and by Department of Industrial Works in 2001. *Note:* *means more than ACGIH TLVs for chrysotile which was 2 fibers/cm^3 (even though it was adjusted to be 0.1 fiber/cm^3 in 2001).

Asbestos related diseases

Asbestosis or other asbestos related diseases have never been reported to the surveillance schemes or the Workmen's compensation fund in this country. Only few pleural thickening cases were notified from a survey conducted by the Division of Occupational health. The survey was carried out in 24 factories in 1987. The data showed that 13 out of 701 workers had pleural thickening from standard chest x-ray. Eight of them had worked for more than 10 years. Unfortunately, they have never been followed up since then. Apart from this study, another 3 studies were conducted afterward. However, no asbestos related disease cases were detected from the studies in spite of high exposure level. This may be due to short duration of exposure among workers (average working duration was 5.2 years).

Since it takes a long period, 15–35 years, to develop asbestosis, most epidemiological data could be gained by an estimation from available data such as exposure of asbestos, duration of exposure etc. According to a literature review, an exposure of asbestos at 2 fibers/cm^3 through working life could cause asbestosis cases about 0.5 % [6].

Conclusions and recommendations

1. Although asbestosis or other asbestos related disease cases have never been detected or reported in the country, the prevention and control of the disease is still very important. Since the trend of using the materials is increasing and the concentrations of asbestos in working envi-

ronments are high, number of cases will be expected to be high in the near future. Therefore, all relevant organization should co-operate and establish the national asbestos control program. This includes the improvement of legislation and enforcement, development of occupational health services system for asbestos exposed workers (especially in disease detection and reporting system), and increase awareness of the disease among employers, employees and public.

2. TLV-TWA of 5 fibers/cm^3 for asbestos was under proposal to change under a consideration of the expert committee in Thailand. At the same time, the Hazardous Substance Committee are under a review to control asbestos use, i.e., reduction of use and finally ban in the long future.
3. Under the Hazardous Substance Act B.E. 2535, the Department of Industrial Works had drafted the criteria for safe use of asbestos as listed:
   - labelling;
   - storage;
   - industrial hygiene and engineering control in factory;
   - environmental monitoring program;
   - safety measures such as spray prohibited, safe use of asbestos products;
   - respiratory protection program and
   - health examination.
4. The concerned organizations namely Dept. of Industry, Dept. of Disease Control, and Dept. of Social Welfare and Labour Protection should be in well-cooperation at work in order to expand a coverage of occupational health service to a small or under-served sector, including a surveillance system of occupational diseases.

References

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