



Asbestos and Mesothelioma in Thailand

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Abstract

Chrysotile, a serpentine asbestos, has been used in a number of Thai Industries for several decades. The material is known to be carcinogenic to humans especially of the serous lining of cavitory organs, producing the rare and highly malignant tumour named mesothelioma. In the period of 57 years (1954-2011) there were only 57 known mesothelioma cases in Thailand, and none of these had pathological evidence of asbestos etiology; one single case among them had a history of asbestos exposure in a factory. The first patient was diagnosed in 1954 as a case of mesothelioma of tunica vaginalis. The first reported case appeared 14 years thereafter.

Studies concerning asbestos in Thailand have been few and almost being carried out under my guidance, i.e. surveys for asbestos bodies in 330 randomised autopsy lungs, determination of air-borne asbestos dusts in heavy traffic streets in Bangkok, verification of asbestos contaminant in vermiculite used in planting, and durability testing of asbestos and non-asbestos cement tiles. Details will be described in the text.

Key words: chrysotile, asbestos, vermiculite, mesothelioma, Thailand

Historical Background

The history of asbestos and asbestos-related illnesses dated back to almost a century; Cooke⁽¹⁾ described pulmonary asbestosis in 1927, Lynch and Smith⁽²⁾ reported lung cancer in asbestos-silicosis in 1935, Doll⁽³⁾ described lung cancer in asbestos workers in 1955, Wagner and colleagues⁽⁴⁾ first mentioned mesothelioma and asbestos exposure in 1960, Selikoff and colleagues⁽⁵⁾ in 1965 substantiated the relation between exposure to asbestos and mesothelioma. My knowledge of asbestos and asbestos-related illnesses has been refreshed during the postgraduate trainings in the United Kingdom in 1953-1955.



Mesothelioma in Thailand

The first report of mesothelioma in Thailand was published by the author and colleagues in 1968.⁽⁶⁾ Thereafter we encountered several additional cases,⁽⁷⁻¹⁶⁾ including cases from other institutions.⁽¹⁷⁻¹⁹⁾ Therefore the collection of mesothelioma cases in Thailand in that period (1954–1998) totaled altogether 39 cases⁽¹⁶⁾ including the unpublished case of a 89-year old man with mesothelioma of tunica vaginalis in 1954 inscribed in the report book of the Department of Pathology, Siriraj Hospital⁽¹⁴⁾. By that time our impression was no asbestos-related diseases in Thailand.⁽²⁰⁾

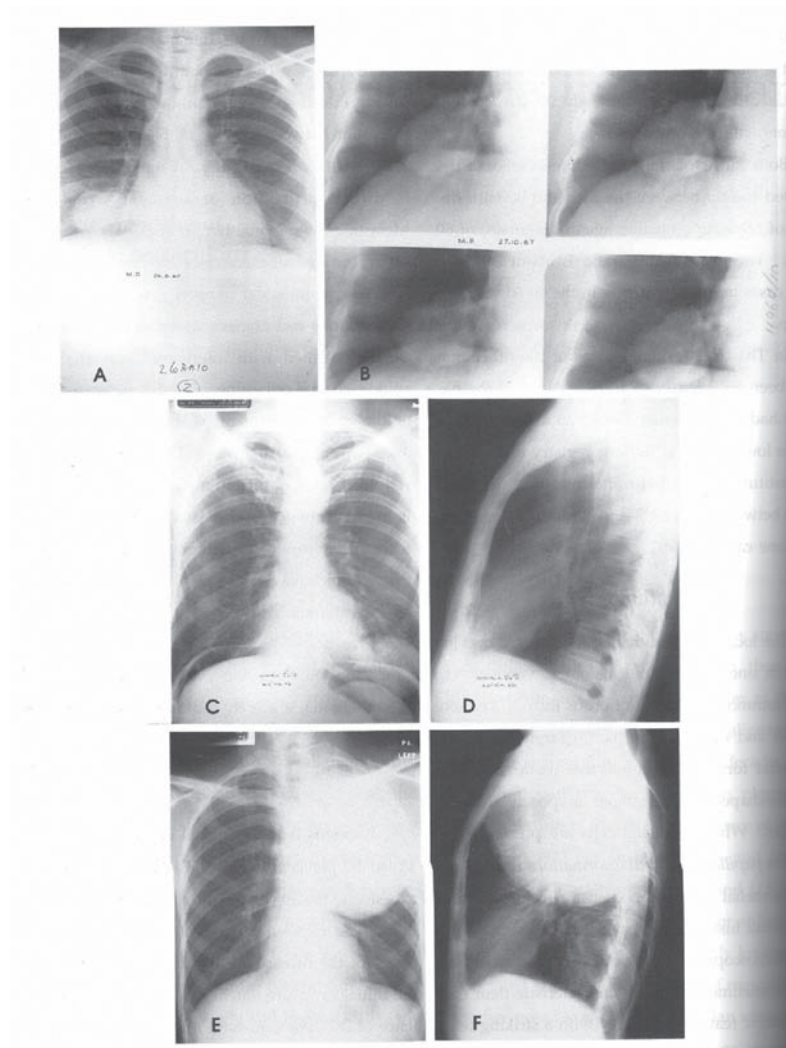


Figure 1. A,B Mass opacity right lower lung field. C,D Mass opacity left lower lung field. E,F Mass left upper lung field.

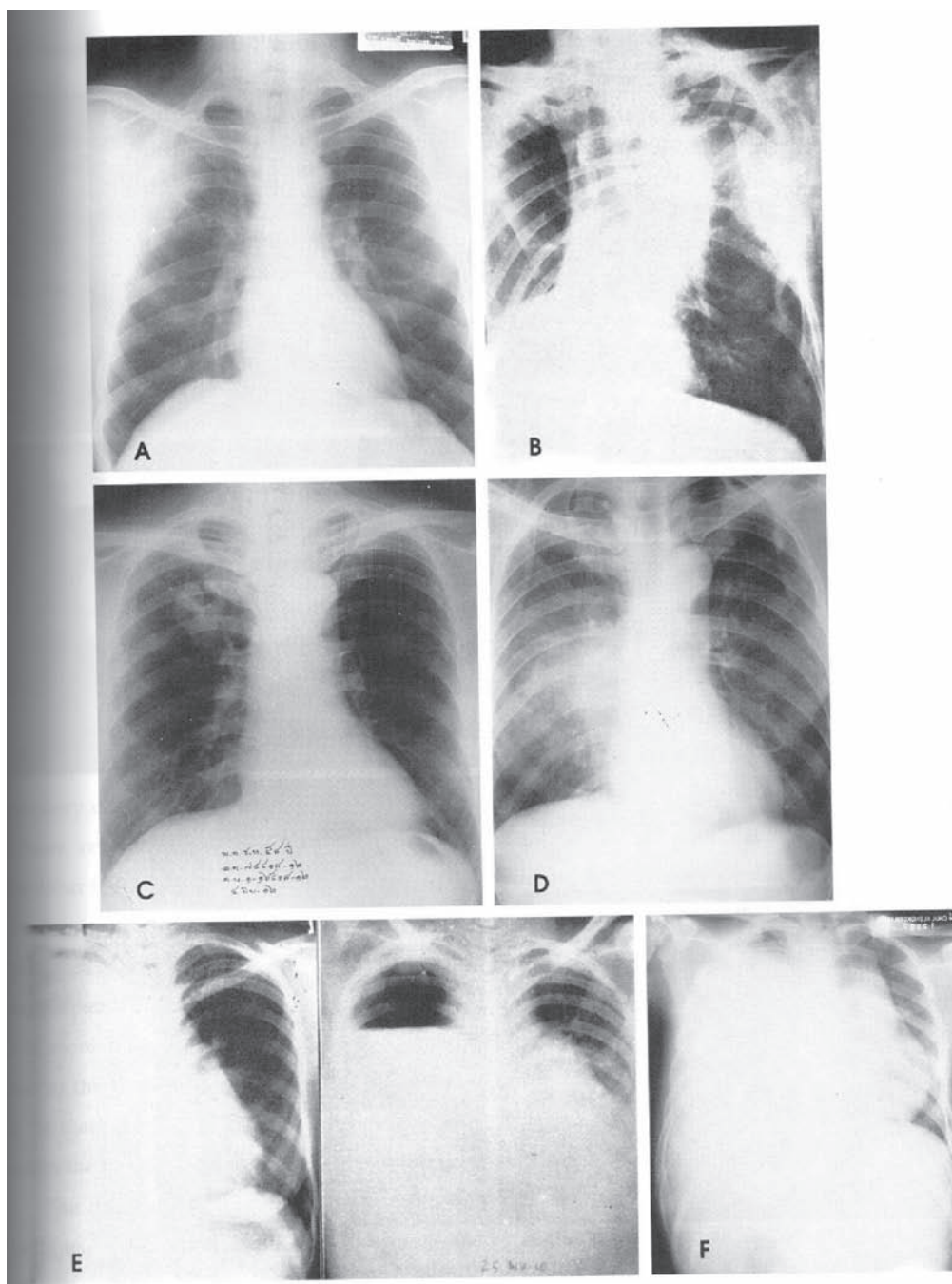


Figure 2. A,B pleural thickening. C,D ill-defined density right upper & right perihilar areas. E,F right-sided pleural effusion.

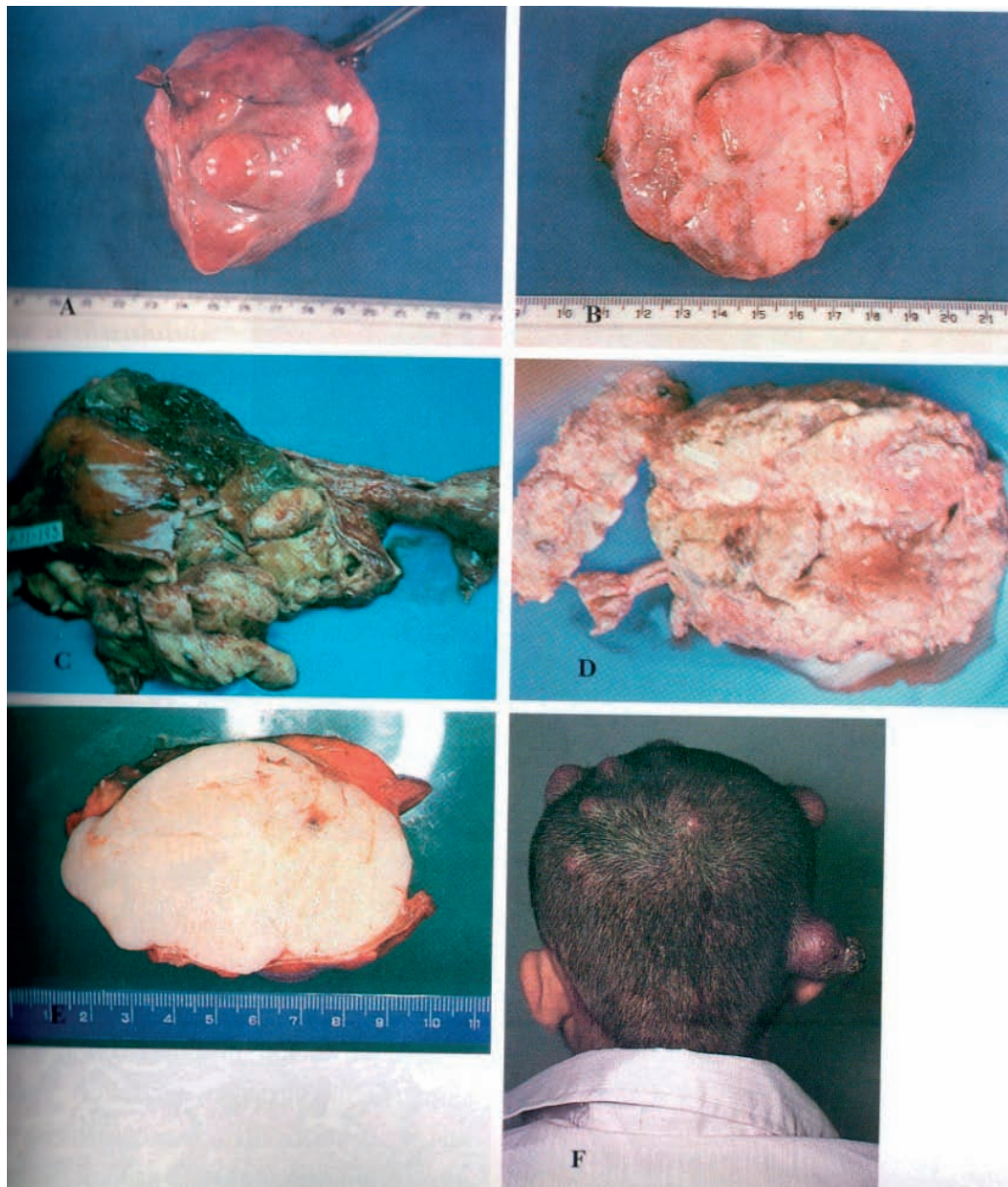


Figure 3. Gross pictures of mesothelioma: first case shown on the left column; second case shown on the right column.

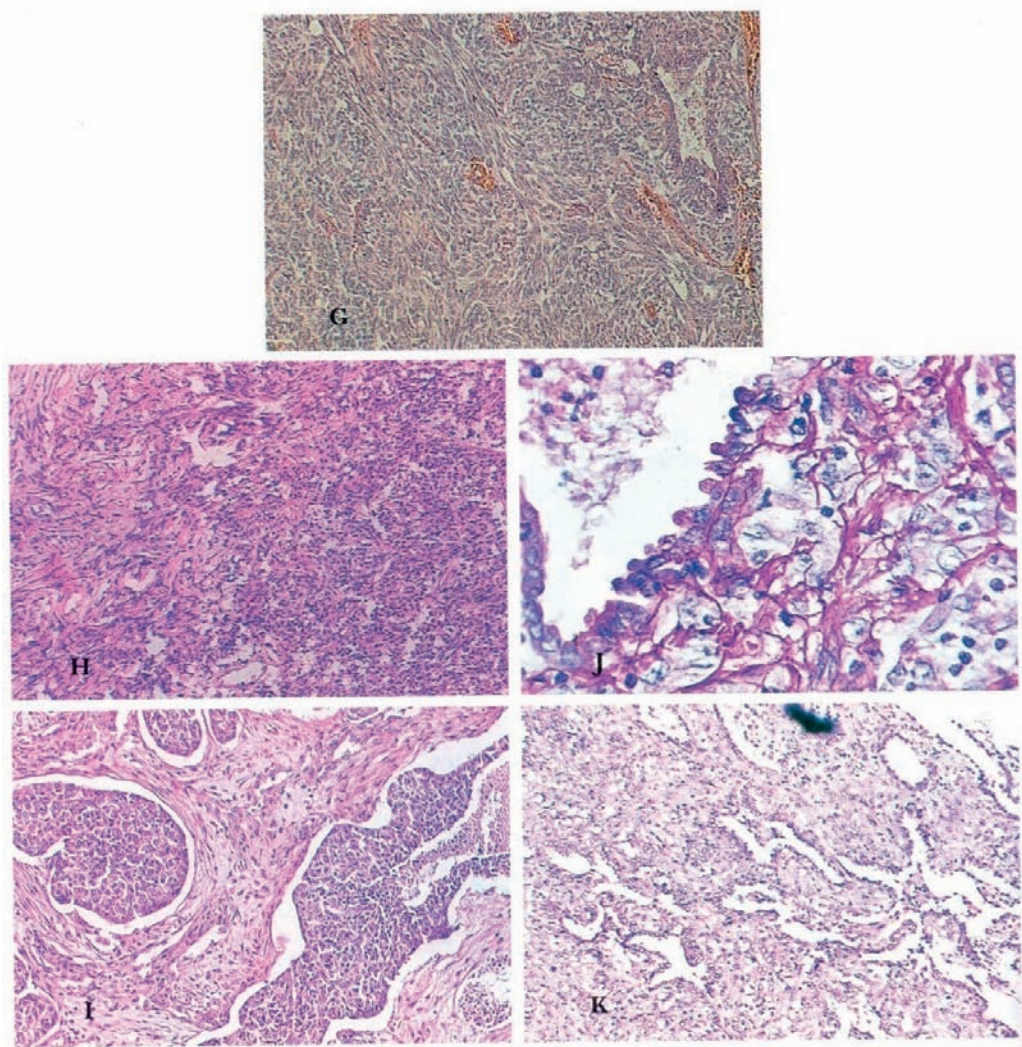


Figure 4. Histological appearance: G & H benign type, spindle cell; I, epithelial pattern—malignant type; J, PAS stain—ve; K, epithelial type

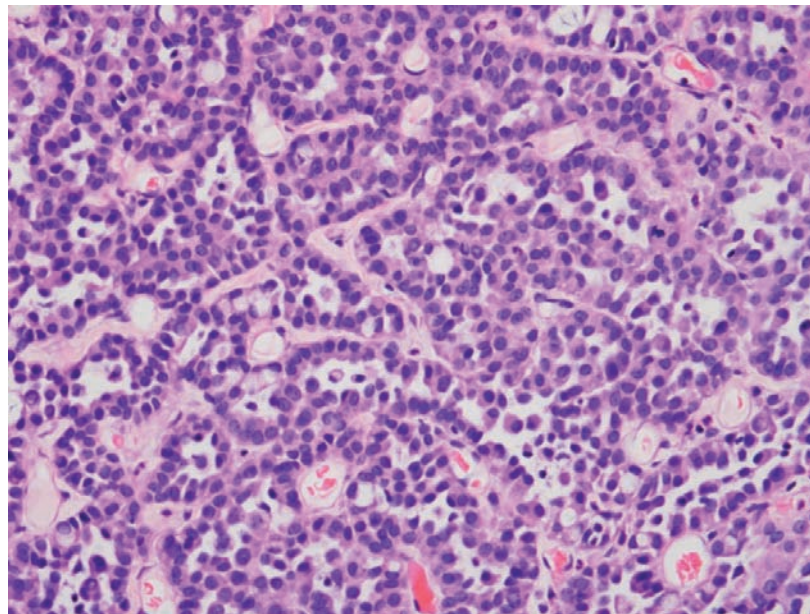
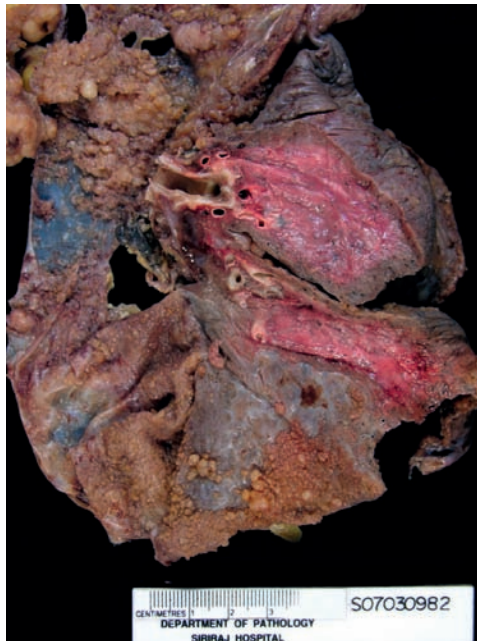


Figure 5. Latest case of mesothelioma

After our report in 1998⁽¹⁶⁾ there was a silent period without case reports for about 10 years, then appeared two successive reports describing the same patient with pleural mesothelioma claiming to be the first instance of occupational



cause.^(21,22) The report was rejected as not being the case of asbestos-induced mesothelioma but likely of undetermined etiology.⁽²³⁾

Subsequent reports^(24,25) added further 16 cases of mesothelioma aged between 10 and 80 years showing variety of afflictions, i.e., the pleura and peritoneum. At the time of writing, altogether 57 cases of mesothelioma were verified which showed no relation with asbestos exposure.⁽²⁶⁾

Asbestos Studies in Thailand

Detection of Asbestos fibers in the lungs^(27,28)

Consequent to the use of asbestos in the country, it was deemed that there was a likely chance of the population at large inhaling the asbestos dusts in the same way as occurring directly in factory workers. We have studied the lungs in 330 autopsies (173 men and 157 women, ranging in age from one day to 92 years), using Smith-Naylor's melting method,⁽²⁹⁾ during the years 1980-1982. The overall positive results were 33 per cent; 34.1 percent in males and 31.8 per cent in females; the youngest was a 5-month-old girl. As regards the number of asbestos bodies in five grams of lung tissue: 90.9 percent of the subjects had 1-10 bodies; only 1.8 percent had numbers higher than 30; the highest number was 142 bodies. The prevalence of positive findings was not related to the increasing ages of the subjects. Occupational and residential histories were not contributory.

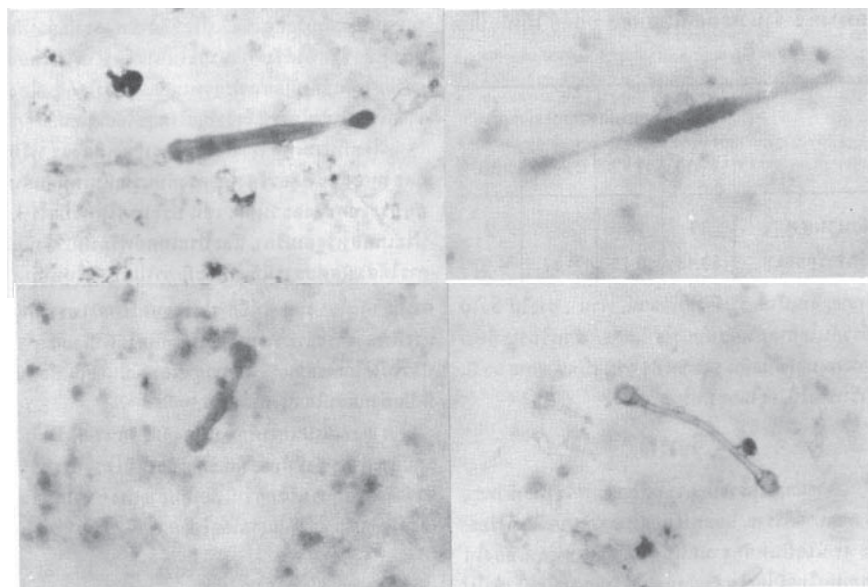


Figure 6. Asbestos bodies in the autopsy lungs



The findings in this study of asbestos bodies in the lungs indicate that the citizens of Thailand have the risk of exposure to asbestos fibres, most probably from the general atmospheric contaminants. With the evidence that positive case has occurred in person as young as 5-month-old which most probably arose from inhalation of the mineral fibres from the use of baby talc powder.

Asbestos Air Pollution in Bangkok Metropolis⁽³⁰⁾

In order to substantiate the hypothesis of airborne pollution as the contributing source of asbestos bodies in the lungs of Thais in the previous studies^(27,28) a further investigation was carried out in the Bangkok area during the dry season of the year 1984. Two hundred and three samples were collected from 10 different main streets during week-day rush hours (8:30-9:30 a.m. and 3:30-4:30 p.m.). The results of the study showed an absolute absence of asbestos fibres. Although the negative findings do not indicate an inhalation route of asbestos entry into the lungs, there remains the possibility of occasional contamination of the air from potential sources of asbestos pollution in some localities during extremely rough weather. Ingestion of contaminated food and drinks could also be a route of entry.

Asbestos in Vermiculite⁽³¹⁻³⁴⁾

Vermiculite is a mineral ore that has been used commercially in insulation for buildings, potting soil and fertilizer, among others. Some of this mineral is known to contain types of naturally occurring asbestos called tremolite and actinolite, to which people can be exposed to by inhaling or ingestion.

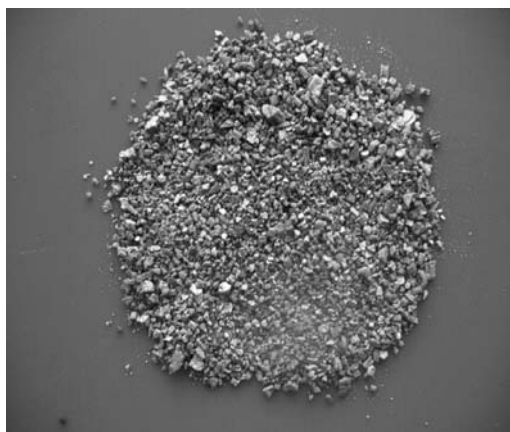


Figure 7. Vermiculite



Our study was conducted on four brands of vermiculite materials imported by Thailand from the Netherlands, the United States of America, Denmark, and Australia. Two methods were used in the study, namely, x-ray diffractometry (XRD) and scanning electron microscopy (SEM). The results were that about half the specimens examined by XRD contained asbestos-like material, but all the specimens were negative for asbestos when using SEM. For technical reasons, the present methodologies may not be absolutely effective in identifying asbestos fibres embedded in thick layers of these materials. Further studies is in progress.

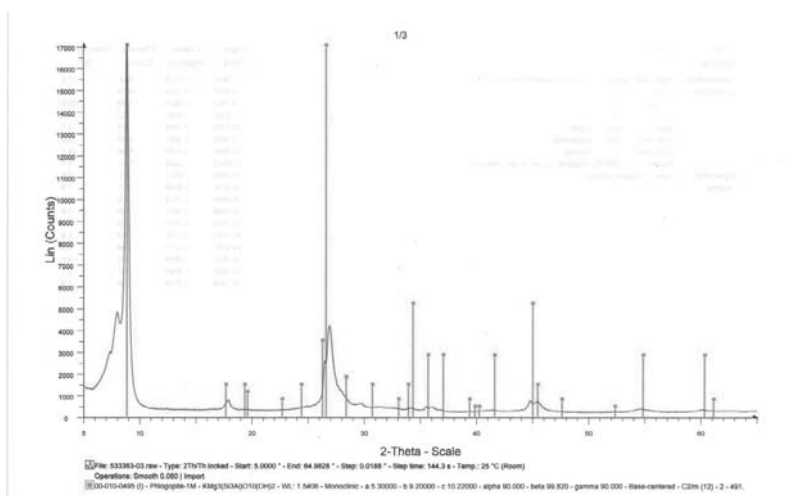


Figure 8. XRD record

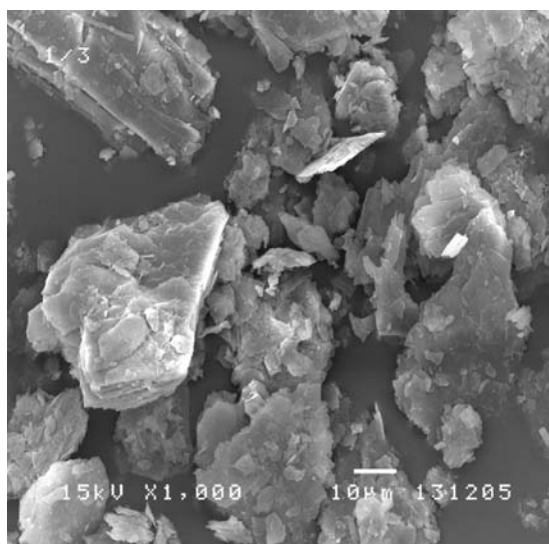


Figure 9. Picture of SEM



A comparative study of strength and durability between asbestos-cement tiles and asbestos-free cement tiles⁽³⁵⁾

In Thailand, asbestos-cement roof tiles have been used widely for over seven decades in favor of its strength and durability. Presently, for its known pathogenic property, other materials have been used as substitute. However, despite the effective control of the related governmental authorities, has been apparent that the dangers in the producing processes and to the Thais at large are none, some tile industries have substituted asbestos with other less toxic materials. The present study was carried just for curiosity regarding the comparative strength and durability of the asbestos cemented tiles and the cemented tiles with substitute.

The results disclose that asbestos cement tiles are much stronger and more durable than the non-asbestos cement tiles.

Asbestos Contaminant in Body Soothing Powders⁽³⁶⁾

There have been reports revealing asbestos contamination of commercial body soothing powders and possibly the cause of lung inflammation in the case of talc pneumoconiosis.

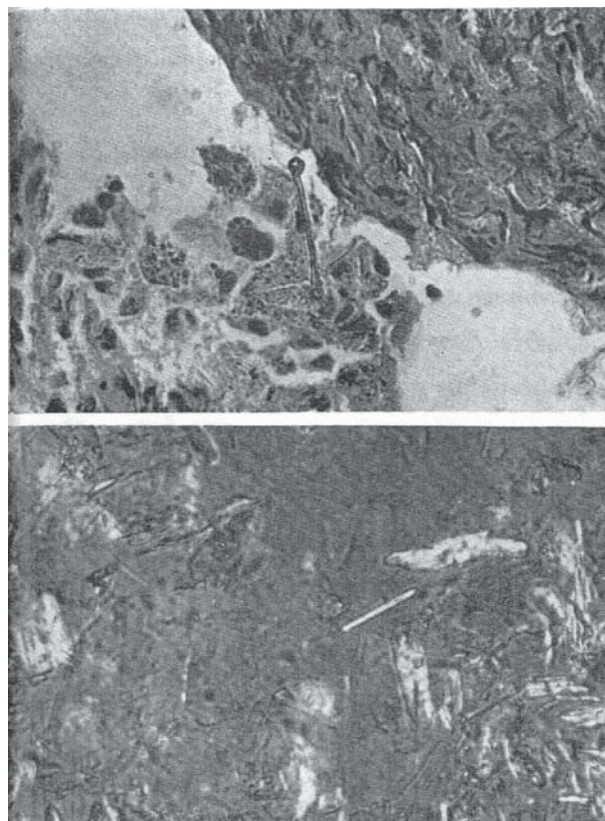


Figure 10. showing asbestos body in the lung and in the body-soothing powder



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