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J. Railroad Companies

The railroad industry trade group, Association of American Railroads, convened annual meetings of its Medical and Surgical Section annually, starting in 1921. The proceedings of these meetings show that they were attended by doctors from the major railroads throughout the United States. The proceedings from 1935 specifically note that asbestosis was a concern to railroad industry doctors, and that education of the workers, hygiene measures, medical evaluations with chest X-ray, air sampling, and respiratory protection were advisable. Similar points were recorded in the medical section proceedings for the years 1937 and 1951-1953. The 1958 proceedings noted that asbestos dust inhalation could also cause cancer of the lungs. Historic documents of railroads operating in Illinois in 1937 record the development of a detailed list of procedures to be followed in the handling of asbestos insulation used on steam locomotives. Railway claims agents also wrote about asbestosis in the 1930s. This awareness of asbestos hazards is recorded in my book on the public health history of asbestos (*Asbestos: Medical and Legal Aspects* 5th Ed. Aspen, NY, 2005, pp. 646-650).

K. Foseco, Inc.

Foseco, Inc. (Foseco, Foundry Services, Inc., Foseco Minsep, Foseco Minsep North America, Inc.) began producing asbestos-containing hot top insulating products for steel mills in about 1962. These insulating hot tops were used to help manage the cooling process of newly poured ingots of steel. As an industrial user of raw asbestos material, particularly at the time they began using raw asbestos in the production of hot tops, Foseco was well placed to be aware of the concerns in medicine, industry, and insurance circles concerning the hazards of asbestos.

In 1965, Foseco produced Research And Development Report No. 82 entitled "Silicosis and Asbestosis Hazards Associated with the Manufacture and Use of Profax" by C. Washbourne. This report, which was labeled "Highly Confidential," summarized Foseco's knowledge regarding asbestos related disease and the hazards associated with their asbestos-containing Profax hot tops. The Introduction section of the report states that "Enquiries are being received from customers regarding the possibility of illness among steelworks personnel arising from the long-term use of Profax . . . further objections have been received regarding a possible asbestosis hazard and its associated danger of cancer of the respiratory tract."

The report describes some of the ways workers can be exposed to asbestos from working with Profax. One of these ways is the mixing of the Profax ingredients. The document states that "whatever dust is produced is highly toxic, and the safest course is obviously to replace blue asbestos with white asbestos in pursuance of current recommendations from Foseco International Ltd." The report further states that "Powered dust-extraction systems can be made to control dusts very effectively, and should be considered seriously for any particularly hazardous operations such as cutting and grinding Profax."

The document also describes the disease asbestosis and states that "Crocidolite (blue asbestos) and amosite are the two most suitable grades for high-temperature insulation, and they are the most dangerous. Chrysotile and other forms of asbestos are slightly less harmful." The document then describes the dangers associated between cancer and asbestos exposure, particularly exposure to crocidolite. The document states that "It has been known for a long time that there is a higher incidence of cancer of the lungs and adjacent tissues among asbestos workers than among the rest of the population." The document continues, stating that "Carcinomata have been found in the pleura of person who had been exposed only occasionally to low concentrations of blue asbestos dust. Extreme cases showed cancer developing up to 30 years after a single exposure."

In the Practical Aspects and Recommendations section of the report, the author states that "The ideal solution is to replace toxic materials, such as silica and asbestos, by non-toxic materials, such as olivine and synthetic mineral fibers." A little later the author states that "Unfortunately, these non-toxic substitutes are almost invariably more expensive than the material they replace, with the result that their use may not be a sound commercial proposition." As an alternative to replacing the asbestos, the author suggests the use of respirators and good ventilation when using the product. In the Summary section, the author also suggests that "regular medical examinations should be conducted upon all personnel handling Profax, and periodic dust-monitoring of the atmosphere may be advisable." Foseco did not discontinue the use of asbestos in their hot top insulating materials until 1976.

It can be concluded that Foseco was well aware of the hazards of asbestos from at least the early 1960s, likely well before that time. Further, as a user of asbestos, and the manufacturer of asbestos-containing products, Foseco had every reason to stay aware of the continuing developments in the published literature on asbestos hazards. It follows that Foseco had an ethical and moral obligation to warn and protect its employees, contractors, and the end users of its asbestos-containing products.

III. CONCLUSION

So to summarize, the literature had largely established that asbestos was a lethal material by the early 1930s, causing disability and deaths from asbestosis. By the late 1940s, it was widely accepted by people writing on the matter that asbestos inhalation could also cause lung cancer. There were several dozen reports of cases as well as editorials and other publications referring to the cancer risk of asbestos in the literature. Most of the authors by that time were concluding that asbestos probably or definitely caused cancer of the lungs, and in some cases cancers of the pleura were counted in as if they were also occupational pulmonary cancers caused by asbestos. The hazard of cancer from asbestos was sufficiently well-known to start appearing in more general references like Scientific American magazine in 1949, Newsweek in 1950, and the Encyclopedia Britannica in 1952. Further, the hazard of asbestos exposure to families of the workers was scientifically knowable since the 1950's. The risk of mesothelioma especially in individuals with environmental, nonoccupational asbestos exposure became a subject of intense discussion in the early 1960's subsequent to the publication Wagner and his co-workers in 1960.

That was what was available in the medical libraries to anyone who knew how to spell the word asbestosis. You could find the information at any time by using Index Medicus, which is a subject index of worldwide medical literature. The Index Medicus has been published since 1879 and can be used to identify articles that are newly emerging on any medical subject including asbestosis. It is one of the things I used in my research. There were many medical texts on occupational diseases, pathology, internal medicine, cancer, lung diseases, and public health, that spoke of asbestos hazards, published in the 1930s and thereafter. Also, the articles themselves often contained numerous references to prior articles, and so in this way one could easily find in a matter of a few hours in a library a great deal of information about a subject like asbestosis using the classical methods. None of this would require using any kind of a computer search or any other kind of modern technique.

Signed this 13 July 2009 in Garrett Park, MD.

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