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DEVELOPMENTS IN DUST SAMPLING AND COUNTING TECHNIQUES IN THE ASBESTOS INDUSTRY

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Introduction

Asbestos dust has long been recognized as an industrial hazard in Great Britain and an extensive survey of the textile side of the industry resulted in the formulation in 1931 of the Asbestos Industry Regulations.[1] These regulations attempted to lay down standards to be achieved and placed upon the industry the onus of instituting measures to limit the dust hazard, which had the effect of initiating a program of dust control that has continued to the present day. To assess the effect of the measures taken, it was necessary to employ some means for the sampling and analysis of airborne dusts and a review was therefore made of the techniques available at the time. The choice was somewhat limited and the situation was complicated by the fact that the equipment then in use had been devised for particulate dust clouds, whereas asbestos dust is fibrous and therefore does not obey the normal laws of settlement.

While it must be accepted that the whole of the respirable fraction of an asbestos dust cloud is potentially dangerous, opinions have varied over the years concerning what fraction of the dust cloud carries the major pathological hazard. Opinions have also varied on whether the physical or chemical properties of the dust were more important. It was therefore desirable to develop a dust sampling system that would collect the whole, or as much as possible, of the respirable fraction.

Earlier Work

In the company with which the author is concerned, early dust sampling instruments tried included the Konimeter and the Owens Jet Sampler. Both these instruments take a "snap" sample and can lead to quite erroneous results in situations of varying concentration. They were therefore soon abandoned in favour of the Thermal Precipitator,[2] an instrument capable of sampling a larger volume of air at a slower rate. It was the best all-round instrument available at the time, claiming 100 per cent efficiency for particles under 10 microns in size, although it was subsequently found to be much less efficient above this point. The dust deposit was collected on glass cover slips, which could be incinerated before counting to remove any organic matter, and counting could be carried out microscopically at high magnification (800 to 1000 ×). The Thermal Precipitator was the standard sampling instrument for many years and provided invaluable

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