Table 5. Assessment of fibrous fractions of dust samples

Sample	Percentage of particles seen to be fibrous	
	Sample not incinerated	Sample incinerated
Brake lining material	28	12·3
Brake drum dust	0·6	1·6
Air-borne dust	—	1·3

It is clearly shown that the percentage of fibres in the drum dust and airborne dust is much lower than that in the dust formed from the original lining material.

Samples of drum dust were examined by Dr S. Holmes, and his tests showed that chrysotile was present only in trace quantities, or at most at 1 per cent, compared with the original lining content of 40–60 per cent. These findings suggest that there is a change in the physical and or chemical form of the asbestos during its use as a brake material.

Enquiries were made of research workers in the UK and USA as to whether they had observed a similar effect. Lynch (1968) reported that tests on brake testing dynamometers had shown the presence of few or no fibres in the dust produced from bus and automobile brakes, except under severe braking conditions. In the latter instance, the brake temperature reached 320–370°C, compared with the design maximum temperature of 290–320°C, and it appeared that, under these conditions, the binder decomposed and released part of the asbestos as free fibre. At lower bulk lining temperatures within the normal operating range, the binder behind the surface remains intact. However, the spot temperature at the point of contact between the lining and the drum may be higher than the decomposition temperature of asbestos. The decomposition product, therefore, includes not free asbestos fibres but a different mineral, resulting from thermal metamorphosis.

Holmes (1967) in reporting the analyses described earlier in this paper, commented that the normal thermal decomposition product of chrysotile is forsterite, a non-fibrous crystalline magnesium silicate. However, our samples of brake drum dust contained very little forsterite, but rather were mainly comprised of an amorphous magnesium silicate, which is non-fibrous. Little was known at that time about the structure and composition of this substance. Whilst there was no evidence to suggest that the material was a health hazard, this possibility could not be dismissed, and animal experimentation has been commenced in the U.S.A.

CONCLUSIONS

Our investigations show that exposure to asbestos during brake maintenance is not as severe as was anticipated, and in the situations we examined, the personal exposure of the operators was below the limit corresponding to 50-year exposure.

It is however recommended that care should be exercised during brake cleaning to avoid inhalation of the dust produced, and the development of cleaning procedures which would reduce air contamination is desirable. The present trend towards the