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RESPIRATORS FOR PROTECTION AGAINST ASBESTOS*

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OVER the past few years the British Standard for Respiratory Protection, BS.2091, has been undergoing a drastic revision. A new Standard, BS.2091:1969, *Specification for Respirators for Protection against Harmful Dusts and Gases* has now been published and is of direct interest in regard to protection against dust including asbestos, as it places the standards of protection offered on a scientific basis.

It does this by controlling facepiece leakage as well as filter penetration and valve slip, so enabling the overall standard of protection to be assessed. For ordinary respirators this protection factor is of the order of 20, that is, the external concentration is reduced to one-twentieth that inside the facepiece. If we use the standards suggested earlier such respirators should afford protection against prolonged exposure to 40 fibres/cm³ of chrysotile asbestos. This appears to be adequate to prevent danger during the operations of brake maintenance procedures, which we have been discussing today.

Perhaps I should mention that there is shortly to be published a new B.S. Specification *High Efficiency Dust Respirators*. These respirators will have a protection factor of 400 and will be suitable for short term protection against very high concentrations of chrysolite asbestos dust. Such respirators will be of the full facepiece or positive pressure type. Full facepieces are not, in general, acceptable for prolonged industrial use and the positive pressure dust respirator, while acceptable to the wearer, has a higher initial cost. A further British Standard *Positive Pressure Powered Dust Respirators* is in preparation, and should be issued later this year. It is unlikely however that during normal brake maintenance operations the concentrations of dust will be such as to require the use of equipment of this type.

An alternative approach is to utilise a half mask fed with compressed air from a suitable uncontaminated source. This type of apparatus offers complete protection for the wearer but suffers from the disadvantage of possible hose entanglement.

Respiratory protection should in general be regarded as providing protection for work where control is difficult or where the work is intermittent and of short duration. It is hoped that the control of the dust will be achieved by the methods indicated earlier and that respiratory protection will therefore only be needed for special work not of a routine nature.

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DISCUSSION

The results for the vacuum funnel *vs.* blow-off experiment and for the vacuum brush versus blow-off are shown in Table 1. It can be seen that the background concentrations during the fifth hour had re-established at the original level after a 2 hr latent period and therefore the blow-off operation carried out during the second hour did not affect the concentrations observed in the vacuum funnel samples collected in the sixth hour. The funnel appears to reduce personal exposure by 2 per cent for particles and 40 per cent for fibres; concentrations observed in the adjacent bay are increased and a reduction in peak concentrations of about 80:1 was achieved.

During the second experiment there was more variability in the background concentrations between the first and fifth hours but the effect of blow-off on the vacuum brush test may be discounted. Personal exposure by use of the brush is reduced by 75 per cent for both particles and fibres and the static samples show a reduction of 20 per cent for particles but an increase of 12 per cent for fibres. A reduction of 80:1 in peak concentrations was again observed.

CONCLUSION

The experiments demonstrated that the vacuum brush was better in reducing operator's exposure; it had the added advantages over the funnel of being easier to handle, consisted of fewer, simpler parts and was much quicker than the vacuum funnel.

There are three major reasons for the relative inefficiency of the funnel; its use increased brake cleaning time (and thus exposure time) by a factor of 8, it was difficult to obtain a good seal at the skirt, and imbalance occurred between the necessary air input and the capacity of the available exhaust system, with resulting leakage of dust.

REFERENCE

COMMITTEE ON HYGIENE STANDARDS, BRITISH OCCUPATIONAL HYGIENE SOCIETY (1968) *Hygiene Standards for Chrysotile Asbestos Dust.* Pergamon Press, Oxford.

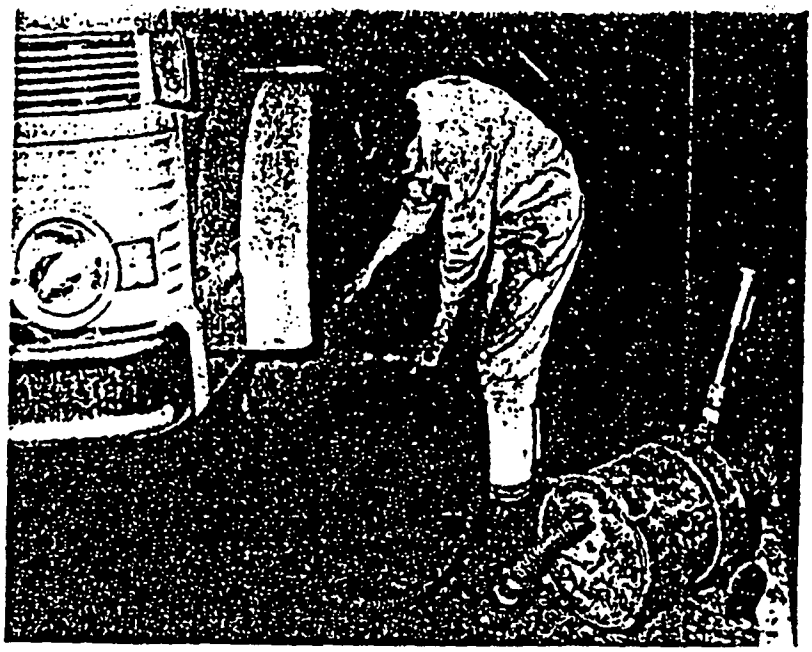

FIG. 1. Funnel method of dust control.