

THE REALITY OF PPE PERFORMANCE

Robin Howie, Robin Howie Associates, Edinburgh, Scotland

Although the "Control Hierarchy" defines that PPE should be used only to complement other preferred techniques, PPE is often provided as the primary control as it is seen as a "cheap option" that provides reliable protection.

It has been recognised for many years that some types of PPE, particularly Respiratory Protective Equipment (RPE), Protective Clothing (PC) and Personal Hearing Protective Devices (PHPD), are inherently uncomfortable and are therefore likely to be worn incorrectly, if worn at all.

Studies to quantify the performance of PPE in real workplaces have consistently demonstrated that the levels of protection provided are substantially lower than indicated by the relevant standards. For example, from the 1970s onwards studies demonstrated that PHPD provided less than half the attenuation predicted by the standard laboratory tests and from the mid-1980s onwards studies on RPE and PC have similarly demonstrated substantially lower performance than expected. In addition, physiological studies on PC have demonstrated that the safe wear time of such equipment can be limited by the heat stress imposed. The relative lack of reported cases of heat strain suggest that in many cases PC is providing lower protection than predicted; as correctly sealed PC will cause heat strain whereas incorrectly sealed PC, which provide limited protection only, permit heat loss to the environment.

In some countries knowledge of real-world performance has been incorporated into selection procedures, e.g. for RPE the levels of protection assumed in Germany, the UK and the US were/are substantially lower than defined in the national or international standards. For example, in the UK full face powered filtering devices fitted with high efficiency filters are currently set an Assigned Protection Factor of 40 as against the Nominal Protection Factor of 2000 from EN standards.

In the US and UK Fit Test techniques have become a mandatory component of RPE programmes; although there is overwhelming evidence that the results of such tests do not usefully correlate with real-world performance. Selection on the basis of Fit Test data is therefore likely to cause some wearers to be provided with poorly fitting devices. In civil litigation cases fit testing may therefore provide RPE manufacturers with a "Get out of jail free" card. The same is also true regarding fit tests for PHPD.

The presentation will outline: the historical literature on the real-world performance of PPE; the physiological effects of wearing PPE; the likely effects of work rates on RPE performance; and, the relevance of Fit Test techniques in the selection of RPE.

Robin Howie

Robin Howie has been involved in occupational hygiene since the mid-1970s and has specialised in the reality of PPE performance, noise induced hearing loss and the consequences of exposure to asbestos for the past 25 years. He gained a Diploma in occupational hygiene in 1982, was a founder Director of the International Society for Respiratory Protection and was President of the British Occupational Hygiene Society in 1997/8. He is currently involved in the development of a novel device for self rescue and in the preparation of medico-legal reports; mainly for asbestos-induced diseases.