

POF020: General platform presentation

Evaluation of a personal data logger to measure real-time breathing cycles across varying work rates.

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Abstract:

The effect of wearing negative pressure respirators on breathing cycles whilst participants perform simulated activities intended to be representative of workplace situations has previously been documented. However, to date, there hasn't been a reliable method to determine personal real-time breathing and metabolic rates required to evaluate the physiological effect of wearing respirators in industry; yet this is required to appropriately select and use respiratory protective devices especially in high intensity work.

The release of ISO/TS 16976:2012 "Respiratory protective devices – Human Factors" Parts 1 & 4, provides a framework to evaluate the basic physiological demands of the wearer of respiratory protective devices.

A personal data logger has been developed by Safety Equipment Australia (SEA) which generates real time workplace data on breathing cycles through negative pressure respirators and enables calculation of metabolic rates for respirator wearers as they perform their daily workplace activities.

Before the data logger can be used in a workplace situation, it must be validated to ensure it is fit for purpose. This paper outlines the tests conducted to determine the accuracy and the precision of the data logger across the range of physiologically acceptable flow rates specified in ISO/TS 16976 Part 1; and reports initial findings of a field trial conducted in heavy industry.

The overall aim of this research is to determine the suitability of the SEA data logger for research use in an industrial setting to aid in evaluating the physiological effects of negative pressure respirator use across varying work rates. It will further inform standards development in this area and aid manufacturers and employers in providing acceptable respirators for use across a range of work activities.