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DMS Ref: COT Gen: 23319.1

MVSSA Conference – Self-Contained Self-Rescuer Expectation Trainer unit

The training in the donning and use of SCSRs at the South African underground mines has been a challenge due to the design of the available training units. The majority of training units that are currently used by the mines' training centres do not provide the trainee with a realistic experience of the sensations of breathing from an actual SCSR. Currently, the training facilitators at the mines' training centres demonstrate the donning procedure to the users using SCSR dummy units during the training sessions. The SCSR dummy units include most of the components of a functional SCSR but excludes the chemical canister. Mine employees are therefore not able to experience what it would feel like to breath from a SCSR as part of their training. A user of an SCSR is likely to be surprised by the sensations of inhaling hot gas and by the higher than normal breathing resistance which are typical of breathing from an SCSR. When experiencing these sensations it is possible that some users would tend to remove the SCSR during the emergency escape, which results in fatalities (or potential fatalities). For this reason, expectation training for wearers and potential users of SCSRs is necessary and long overdue.

In response to the industry need, the CSIR SCSR laboratory **designed and developed a new product** - the SCSR Expectation Trainer unit. Through rigorous testing in the laboratory and refinement of the design the CSIR developed a training device that reliably offers the user a realistic simulation of breathing from an actual SCSR and the design has since been patented. The SCSR Expectation Trainer has been designed for classroom training. Its purpose is to allow the person being trained (user) to experience the sensations (i.e. heat and breathing resistance) that are commonly experienced when chemical based SCSRs are activated and donned. Through experiential training using the CSIR's SCSR Expectation Trainer as part of regular emergency response training, the mining industry can greatly reduce the risk of incorrect use of SCSRs.

Through developmental testing using laboratory breathing simulators and human subjects the prototypes were refined to meet the same operational temperature and breathing resistance specifications that apply to actual SCSRs. The users will experience an inhalation temperature of between 65 ^{0}C and 40 ^{0}C for approximately 7 minutes. The SCSR Expectation Trainer is designed to simulate the elevated breathing resistance of above 1 000 Pascal that can be expected when breathing into a real SCSR unit toward the end of the SCSR's oxygen supply period.

The CSIR's SCSR Expectation Trainer unit is unique and is free from inherent risks that are associated with other Original Equipment Manufacturers (OEM) chemical based training units. Furthermore, the SCSR Expectation Trainer has been designed to be coupled to the existing OEMs training dummy units so that the users can experience a complete donning and use of different SCSR types. The SCSR Expectation Trainer offers a relatively low cost, re-usable option that should make it possible to allow all users of SCSRs to undergo regular experiential training. **It is the first time** that a product is available that combines a realistic user experience with low cost, low risk and being re-usable. Widespread experiential training will mean **more lives saved** in an emergency event such as an underground fire.

The CSIR has identified Hannover Engineering, a long-standing collaborator in the development of SCSR technologies, as a potential manufacturer of the SCSR Expectation Trainer. The determination of distribution logistics are at an advance stage of discussion between CSIR and SCSR OEMs to allow the existing SCSR distribution channels to accommodate the distribution of the SCSR Expectation Trainer unit.