Committee Spotlight

Respiratory Protection Committee Identifies Research Priorities

BY HARRY ETTINGER, LARRY JANSSEN AND RICH METZLER

In 2007–2008, the AIHA® Respiratory Protection Committee (RPC) determined that it would identify priorities for respirator research and development. A subcommittee headed by Larry Janssen was assigned responsibility for identifying technical topic areas that were appropriate for consideration and of prioritization by the entire RPC. The subcommittee identified 18 priority topics in fit-testing, anthropometry/test panels, respiratory protection programs, device performance, and physiology/user considerations.

As this effort progressed, the RPC decided to develop a white paper identifying a limited number of priority areas and submit it to NIOSH, the primary source of funding for respirator research and development in the United States. The RPC is finalizing the white paper and seeking approval from the AIHA Board of Directors prior to submission to NIOSH. Our hope is that the paper's recommendations will be incorporated into the NIOSH program.

Many current practices in respiratory protection are based on assumptions, professional experience, best judgment or extrapolation from laboratory studies. Limited studies have evaluated the efficacy of, or the need for, each practice. The RPC believes that the practical, applied research topics presented in the white paper will significantly enhance the safe and effective use of respiratory protection.

Research Priorities

Following are the seven research priorities identified in the white paper. Some of the topics involve operational considerations, and the proposed studies would benefit from coordinated efforts by operational and research and development or health and safety professionals.

1. Conduct a comprehensive literature search on the measurement of respirator performance to identify what is known and what is not known on this topic. This review would establish a set of research projects to fill gaps in information and technology. Ultimately, these projects would permit reliable assessment of respirator performance in the laboratory and in the workplace and relate their performance in these settings. At this time, no clear consensus exists on the "correct" way to measure respirator performance—for example, total inward leakage, workplace protection studies, simulated workplace protection studies, laboratory studies, etc.—or how to interpret test results from these techniques.
2. Develop a qualitative fit-test (QLFT) capable of screening for a minimum fit factor of 500. This would allow full facepieces to be qualitatively fit-tested and used in atmospheres where exposures are up to 50 times the occupational exposure limit. Because the current QLFT screens only for a minimum fit factor of 100, full-facepiece respirators must be quantitatively fit-tested if they will be used in a work situation that requires an assigned protection factor (APF) greater than 10. This situation is problematic for many smaller employers.
3. Determine whether the current fit factor screening level of 100 for qualitative and quantitative fit-testing of half facepieces is necessary and appropriate in light of the APF of 10 for these respirators. Limited simulated workplace protection factor (SWPF) information indicates that a SWPF of 50 might be acceptable while maintaining wearer protection at an assigned protection factor of 10. Resolving this question might provide workers with more options, comfort and flexibility in some situations.
4. Investigate in-face piece contaminant measurement technology and methods to determine whether current methods provide accurate estimates of total inward leakage. Current U.S. regulations specify probe placement, but measurement of performance is meaningful only if the inside sample accurately represents penetration into the device and inhalation by the wearer.
5. Determine the necessity and value of each element of an acceptable respiratory protection program (RPP). The relative importance of all the elements of the traditional RPP, such as those required by OSHA, has never been studied systematically. Some RPP elements may not be necessary to provide respirator users the appropriate level of protection.
6. Determine the efficacy of user seal checks in trained user populations to determine if they are necessary to assure protection, and determine the real-world frequency of performing seal checks. These simple tests are required by regulation, called out in respirator user instruction manuals, and emphasized in user training programs. However it is not clear if workers perform these checks at every donning in the workplace, or if they actually increase worker protection.
7. Determine if there are conditions under which organic vapors are significantly desorbed from powered air purifying respirator (PAPR) cartridges during periods of non-exposure, and if certain organic vapors are more likely to undergo desorption than others. This type of desorption could potentially result in overexposure of the wearer under realistic respirator use conditions.

Comments Welcome

The RPC will post the complete white paper as well as summaries of the 18 original subject areas to the committee page of the AIHA website. Individuals may comment either to the RPC or directly to NIOSH. The RPC recognizes that some health and safety professionals may disagree with our prioritization of the research areas. All comments, suggestions, and constructive criticism are welcome and should be directed to Jay Parker, chair, RPC, ezp3@cdc.gov.

Harry Ettinger, Larry Janssen and Rich Metzler are members of the AIHA Respiratory Protection Committee.