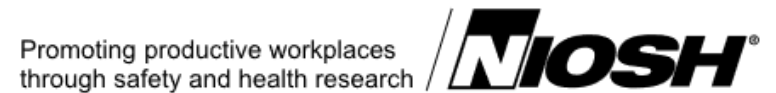




The Wayback Machine - <https://www.cdc.gov/niosh/awards/hamilton/aliceabs10.html>

The National Institute for Occupational Safety and Health (NIOSH)



Alice B. Hamilton Awards 2010

Educational Materials Category

Winner:

- **Title:** Refuge chamber expectations training
- **Authors:** Margolis KA, Kowalski-Trakofler KM, Kingsley, Westerman CY
- **Source:** Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication Number 2010-100, Information Circular 9516, 2009
- **Description:** Underground coal mining is one of the most hazardous industries in the U.S. Twenty-five miners perished in a series of mine disasters in 2006 and 2007 that included two explosions, one fire, and a massive pillar-failure event. The availability of refuge chambers in the mines could have saved fourteen of these victims. Refuge chambers, a new and complex technology mandated by the federal government for all underground coal mines, provide approximately 96 hours of breathable air, water, food, and supplies in the event of a crisis during which miners are unable to escape the mine. This training product cogently and clearly explains the psychological and physical stressors that miners should expect in a refuge chamber, using an effective multi-media presentation that incorporates video clips from mines, realistic photos of refuge chambers, and surviving-miner testimonials. An instructor's guide accompanies the multi-media presentation and includes discussion questions that trainers can ask the trainees before and after viewing the presentation.



[Link to the instructor's guide](#)

[Link to the multi-media presentation](#)

Honorable Mention:

- **Title:** Current Intelligence Bulletin 61: A strategy for assigning new NIOSH skin notations
- **Authors:** Schulte P, Ahlers HW, Chen CP, Demchuk E, Dotson GS
- **Source:** Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2009-147, 2009
- **Description:** Even though occupational skin diseases are frequently reported, occupational exposure limits (OELs) and controls mostly focus on the health risks associated with inhalation of chemicals. As a result, workers may experience a wide spectrum of adverse health outcomes related to dermal exposures to chemicals. In the absence of OELs, qualitative hazard designations called skin notations can be used to alert workers and employers to the potential health risks of skin contact with chemicals. These hazard designations have traditionally provided warnings when a chemical had the potential to be absorbed through the skin without regard to localized, systemic, and sensitizing effects. In addition, the underlying decision criterion for assigning skin notations to a particular substance has not always been well documented. To address these issues, this document presents an enhanced strategy for the assignment of multiple hazard-specific skin notations that address systemic toxicity, direct or localized skin effects, and sensitization effects. This enhanced strategy represents a fundamental paradigm shift from historical methods and allows for better hazard communication and risk management, including a more informed decision on what controls to implement in order to prevent or limit further exposures.

[Link to full publication](#)

Biological Sciences Category

Winner:

- **Title:** Mouse pulmonary dose- and time course-responses induced by exposure to multi-walled carbon nanotubes
- **Authors:** Porter DW, Hubbs AF, Mercer RR, Wu N, Wolfarth MG, Sriram K, Leonard S, Battelli L, Schwegler-Berry D, Friend S, Andrew M, Chen BT, Shuji Tsuruoka S, Endo M, Castranova V
- **Source:** Toxicology 269(2-3): 136-147, 2010 (Available online 24 October 2009)
- **Description:** Through bronchoalveolar lavage (BAL) methods, this study determined that pulmonary inflammation and damage induced by multi-walled carbon nanotubes (MWCNTs) was dose-dependent and persistent. In addition, through histopathological methods, it determined that MWCNT exposure caused rapid development of pulmonary fibrosis during the seven days following exposure, that granulomatous inflammation persisted throughout the 56-day post-exposure period, and that MWCNT can reach the pleura after pulmonary exposure. In summary, the data reported in the study indicate that MWCNT exposure rapidly produces significant adverse health outcomes in the lung. Furthermore, the observation that MWCNTs reach the pleura after aspiration exposure indicates that more extensive investigations are needed to fully assess whether pleural penetration results in any adverse health outcomes. This was the first demonstration and report that after pulmonary exposure MWCNTs can reach and penetrate the pleura. This finding is of major significance, in that pleural penetration is a key feature in asbestos-induced adverse health outcomes. Investigations continue on the health implications of MWCNT exposure, including pulmonary inflammation, fibrosis, carcinogenesis, and mesothelioma using an inhalation system developed at NIOSH.

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Honorable Mention:

- **Title:** Development of a test system to evaluate procedures for decontamination of respirators containing viral droplets
- **Authors:** Vo E, Rengasamy S, Shaffer R
- **Source:** Applied and Environmental Microbiology 75(23): 7303-7309, 2009
- **Description:** During a pandemic outbreak, a limited amount of respirators or surgical masks may be available. In this situation, physical and chemical decontamination procedures can be used to extend respirator lifespan. For example, these procedures may allow a second day of respirator use, which may alleviate the shortage of respirators. This study reports on a newly developed test system that provides a standard method for evaluating decontamination efficacy of physical and chemical procedures for viruses deposited on respirators as droplets. The method was designed to simulate respirator surface deposition of infectious virus droplets shed by individuals. The test system was used to generate and load viral droplets onto respirators uniformly, which allowed researchers to successfully evaluate the effectiveness of decontamination procedures of respirators. Results can be used by NIOSH and CDC to develop scientific recommendations on respiratory protection for healthcare workers and the general public during a pandemic outbreak with a shortage of respirators. The study has attracted the attention of a potential commercial user and was used to develop a draft ASTM standard test method (ASTM E35.15).

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- **Authors:** Hsiao H, Whitestone J, Taylor S, Godby M, Guan J
- **Source:** Human Factors 51(4): 497-518, 2009
- **Description:** Existing sizing systems for fall protection harnesses are predominantly based on data from males serving in the military and do not address the needs of the current U.S. workforce. This study builds on earlier research that demonstrated that merging men and women sizes results in improper harness fit. In this study, three-dimensional torso data from 243 women and 258 men were incorporated into eight validated equations to develop a harness sizing plan and to define strap lengths. An improved harness sizing scheme was identified. For vest style harnesses, four harness sizing schemes would be required each for men and women. For overhead style harnesses, three sizes for men and four sizes for women would be necessary. Four tables are provided that can be used by manufacturers to set improved harness cut lengths. In addition, the new sizing charts are graphed by gender, body weight, and body height in four figures. This information can be used by harness manufacturers to formulate cost-effective harness designs and sizing schemes for diverse populations and by workers and employers to provide workers with the appropriate level of protection and improve their productivity and comfort.

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Honorable Mention:

- **Title:** An investigation on characteristics of the vibration transmitted to wrist and elbow in the operation of impact wrenches
- **Authors:** Xu XS, Welcome DE, McDowell TW, Warren C, Dong RG
- **Source:** International Journal of Industrial Ergonomics 39(1): 174-184, 2009
- **Description:** Approximately 2 million workers in the United States and millions more world-wide are regularly exposed to hand-transmitted vibration (HTV) and are at risk for developing hand-arm vibration syndrome (HAVS). The vibration measurement method specified in current ISO and ANSI standards is somewhat intrusive because the accelerometers that need to be installed on a tool or machine can significantly interfere with worker activities. This results in measurements of short duration, which may not accurately access exposure and work-rest patterns. Also, it is not feasible to install a vibration sensor on every vibrating tool at workplaces. To address the need for a reliable, practical, and objective method to continuously monitor real workday vibration, this study investigated the feasibility of measuring HTV exposure at the wrist and elbow. Vibrations transmitted to the wrist and elbow during impact wrench operation were evaluated and compared with vibrations measured on the tool handle for six subjects using fifteen impact wrenches on a simulated work station. Results showed that vibration up to 400 Hz was accurately measured and that the accelerations at the wrist and elbow were reliably correlated with the ISO frequency-weighted tool acceleration. These findings demonstrate the usefulness of measuring wrist vibration and have led to the initiation of the development of a new vibration measurement system: a human vibration wrist watch.

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Human Studies Category

Winner:

- **Title:** Development of sizing structure for fall arrest harness design
- **Authors:** Hsiao H, Friess M, Bradtmiller B, Rohlf J
- **Source:** Ergonomics 52(9): 1128-1143, 2009
- **Description:** This article reports on a series of studies on fall arrest harness design and production to protect diverse worker populations. A three-dimensional elliptic Fourier analysis (EFA) procedure with 123 coefficients was developed to quantify torso-shape effect on harness fit, based on anthropometric data from 108 women and 108 men. The EFA coefficients were then applied to 600 nationally representative body scans to establish an improved sizing system. It was demonstrated that increased inclination of torso suspension angle (resulting in fit failure) was associated with a reduction in torso length and a more developed chest. A more upward design is needed of back D-rings for women than the currently available unisex design, in order to accommodate female torso form and improve harness fit for women. Accordingly, new harness sizing charts for women and men are proposed. Results are currently being used by leading harness manufacturers to develop improved harnesses and by the ANSI Z359 standard committee that aims to establish a harness sizing and configuration standard.

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Honorable Mention:

- **Title:** Effectiveness of vertical visual reference for reducing postural instability on inclined and compliant surfaces at elevation
- **Authors:** Simeonov P, Hsiao H, Hendricks S
- **Source:** Applied Ergonomics 40(3): 353-361, 2009
- **Description:** Falls from elevation continue to be the most serious hazard for construction workers. However, existing fall prevention and protection methods may not be practical for many construction environments and tasks. Simple and cost-effective technical approaches to improve workers' balance on sloped roofs and deformable or unstable platforms have the potential to reduce the risk of falls. This article presents essential scientific information that can be applied directly to the development of effective fall prevention strategies during construction work at elevation. The study's experimental design involved a carefully selected range of critical environmental characteristics that interact with workers' visual attention and balance-control responses in a dose-dependent fashion. Enhanced workers' balance performance was demonstrated in the presence of simple and inexpensive proximal cues. Findings may be used to modify elevated work environments and construction procedures. For example, early erection of light vertical structures or guardrails can improve workers' postural balance during various construction phases. Results also may be used to develop simple language material on the use of visual cues as part of workers' safety training. The discussion of the findings emphasizes both the study's theoretical value for ergonomics research and its practical value for the development of safety applications.

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