

booth, using the same paint system. Air samples and Permea-Tec pads were analyzed for acetone, MEK, MIBK, toluene, butyl acetate, ethyl benzene, and xylenes, all among the solvents commonly found in auto body refinishing. Although individual airborne solvent levels were low (the highest measured airborne component was toluene, at 31.4 mg/m³), quantifiable solvent exposures were detected inside gloves and coveralls in all three painting events, toluene most consistently. The personal protective equipment exposures were highest in the samples of longest duration: 22 min. Under these conditions, the nitrile gloves appear to offer some, but not complete, protection. Outside-glove exposures were consistently higher than inside-glove exposures, but coveralls did not provide protection in this study.

324

SAMPLING AND EVALUATION OF OPERATORS' RESPIRATION AT WORK

H. Yuasa, K. Fukiura, T. Honda, K. Kimura, H. Emi, K. Nozaki, KOKEN, Hanno, Japan.

Respirators are used to protect their wearers from exposure to harmful substances. Therefore, performance evaluation of respirators should be performed using respiratory waveforms of operators while they are at work. Many recent studies have conducted respiration analyses of test subjects under work load in laboratories. However, few cases have analyzed respiration of actual operators at work. In this study, we developed a sampling device that obtains and analyzes respiratory patterns of operators while they are at work and collected respiratory waveforms of actual operators at work using this device. This sampling device consists of a particulate respirator that carries a micropressure gauge, data logger, and batteries. Fluctuations of internal pressure of a respirator due to respiration of wearing operator is detected by a differential pressure sensor and recorded in the compact data logger. Before conducting analysis, the respiration data is converted to flow patterns using an analytical curve in a laboratory. At first, in order to evaluate the sampling system, we entered pulsation flow data that has a known flow rate and then compared the obtained waveform data and the basic waveform. As a result, difference of flow rate was less than 5% for 10–40 L/min respiration rate of this device. We analyzed respiration data obtained with the device for three welding operators at work. There was a significant difference in respiration rate between operators (17–32 L/min), despite the small number of test subjects. The peak inspiratory airflow rate of operators was 145 L/min; however, the percentage of inspiration that exceeded 85 L/min was less than 30%. This result suggests that 85 L/min is more than enough to evaluate the performance of particulate respirators under a moderate workload in Japan.

325

OBSERVATIONS OF RESPIRATOR USE BY DEMOLITION COMPANIES

D. Groce, EG&G Technical Services Inc., Point Marion, PA; B. Doney, M. Greskevitch, NIOSH, Morgantown, WV; D. DeJoy, University of Georgia, Athens, GA; C. Oke, NIOSH, Pittsburgh, PA.

Our objective was to identify distinguishing features of respirator programs in demolition companies. Focus group data indicate that large demolition companies are attentive to respirator use, perhaps due to the potential presence of hazardous substances during routine demolition operations. These substances include silica, asbestos, lead, metal fumes, and miscellaneous chemical vapors. During 2006, NIOSH investigators visited five sizable demolition companies, including six work sites in Houston and Chicago. The purpose was to increase the knowledge base regarding policies and practices found to strengthen respirator use as well as to gain insights regarding successful respiratory protection programs. Some companies worked throughout the United States, while others worked only in Chicago or Houston. The nature of their work included demolition of industrial, commercial, and public buildings as well as industrial complexes. (The companies visited are not necessarily representative of the entire demolition industry.) The visits with demolition companies identified the following practices as important to successful respiratory protection programs: (1) a clear company priority for safety and health; (2) frequent safety meetings, specifying circumstances requiring respiratory protection, at the job site; (3) providing a safe, clean area for storing respirators; (4) easy availability of replacement respirator bodies and filters; (5) maintenance of a stable work force. Two problems with respiratory protection implementation were identified during site visits: (1) difficulties in keeping respirators clean over an extended period of time, and (2) the need to be vigilant to minimize physical interference between respirators and other personal protective equipment. Investigators will use the data gathered from these companies to recommend enhancements to respiratory protection programs throughout the construction industry.

326

HEAT STRESS AND STRAIN ASSESSMENT OF AIRPORT SCREENERS DURING CHECKED-BAGGAGE SCREENING

C. Dowell, NIOSH, Cincinnati, OH; L. Delaney, NIOSH, Atlanta, GA.

NIOSH received a health hazard evaluation request from the Transportation Security Administration (TSA) at Palm Beach International Airport. The request asked NIOSH to

determine the potential for exposure to heat stress conditions for checked-baggage screeners. The request indicated that some screeners had experienced health problems possibly related to heat stress, including heat cramps and heat exhaustion. In response, NIOSH investigators measured wet bulb globe temperatures (WBGT) to evaluate heat stress conditions and core body temperature (CBT), heart rate (HR), and pre- and post-shift body weight measurements to evaluate individual heat strain. WBGT readings ranged from 77.5°F to 83.9°F. When compared to the NIOSH and ACGIH screening criteria, the results indicate that screeners were exposed to excessive heat stress conditions during the evaluation. Twenty-three participants were monitored for physiological signs of heat stress during their work shifts. All screeners were considered acclimatized to their work environment. Eight participants showed signs of heat strain. One of the screener's CBT exceeded the ACGIH criterion of 101.3°F for acclimatized workers. There were 10 instances of screeners' HRs exceeding the ACGIH criterion of 180 minus their age. In addition, three of the screeners had average HRs that approached or exceeded 115 beats per minute during the shifts they were monitored. None of the screeners had a body weight loss exceeding the ACGIH criterion of 1.5%. TSA screeners were exposed to heat stress in excess of the occupational criteria and some developed signs of heat strain as measured by CBT or sustained HR. In addition, some complained of symptoms of heat strain. Recommendations were provided for identifying and reducing heat stress and strain, including engineering controls and the establishment of acclimatization, education, surveillance, and heat alert programs.

327

EVALUATING ENVIRONMENTAL NOISE EXPOSURES IN RURAL MISSOURI

D. Bryant, G. Popov, University of Central Missouri, Warrensburg, MO.

Rural environmental noise exposures provide opportunities for assessing nonauditory effects of sound. Low population density attracts land uses that are unpopular in suburban and urban locales, resulting in economic opportunities for rural communities. Noisy recreational facilities, such as motocross tracks, are springing up in the country. Rural residents accustomed to the peace and quiet of their farmland and woods feel violated by these acoustical changes and often resort to legal action, requiring the expertise of industrial hygienists (IHS) to recognize and evaluate nonauditory health effects. This case study explores the regulatory boundaries, local and global guidelines, and the appropriateness of the A-weighted scale for evaluating environmental noise created by motocross racing. The only environmental noise regulations in rural Missouri apply to airports. Local noise ordinances do exist in major

Abstract Book

Sparking Tradition With Invention 



June 2-7 • Philadelphia

**The Premier Conference
and Exposition for
OEHS Professionals**



AIHce 2007

Co-sponsored by AHA and ACGIH®