

### DIESEL-POWERED VEHICLE EXHAUST VOLUMES IN U.S. ARMY MAINTENANCE FACILITIES. G. Berckman, U.S. Army CHPPM-North, Fort George G. Meade, MD.

The currently-used guidance for local exhaust ventilation (lev) design in diesel-powered vehicle maintenance facilities was extrapolated from empirically determined data collected at some point in the past. Diesel technology has come a long way since these standards were written, especially with the advent of the wide-spread use of turbochargers, and it is unclear whether these currently-used designs are adequate for proper contaminant removal. The first step in validating the efficacy of the current designs (or in devising new ones) is to determine exhaust flow volumes from the vehicles whose emissions we are attempting to control. This volumetric flow data can be used to validate currently-used design criteria or to prepare new lev standards for such vehicle emissions. Based upon the data collected during this project, the currently-used criteria for lev for turbocharged diesel-powered vehicles in Army maintenance facilities is excessive. Such criteria should be revised downward to a lev flow rate of 1320 cfm for most facilities which service commonly used vehicles such as commercial utility cargo vehicles, high-mobility military vehicles, and M816 wreckers. For shops that service larger equipment, such as M916 20-ton tractors, the required lev flow rate should be revised to 1740 cfm. It is the author's intent that these data will be used, as stated above, to validate currently-used design criteria, or, failing that, to prepare new lev standards for such vehicle emissions.

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### AIRPORT "CHECKED BAGGAGE" SCREENER EXPOSURE TO INTERNAL COMBUSTION ENGINE EXHAUST PRODUCTS. M. Methner, NIOSH, Cincinnati, OH; L. Delaney, NIOSH, Atlanta, GA.

The Transportation Security Administration (TSA) requested the National Institute for Occupational Safety and Health (NIOSH) to evaluate airport "checked baggage" screeners' exposure to diesel particulate matter (DPM), carbon monoxide (CO), nitric oxide, nitrogen dioxide, and other products of combustion. Exposures were believed to be related to internal combustion baggage tug engines operating near the screeners. Four international airports (Palm Beach, Miami, Baltimore-Washington, and Dulles) were selected for air monitoring studies. The selection criteria included the following: (1) prior complaints from TSA workers regarding exhaust emissions; and (2) the location and arrangement of the check baggage stations (open versus enclosed screening areas). Each airport study was designed to collect the same information so that air monitoring data could be compared across airports. Personal breathing zone (PBZ) and ambient air samples were collected and analyzed in accordance with

appropriate NIOSH methods. All PBZ measurements were compared to their respective occupational exposure limits. No respiratory protection was worn by any worker in any of the airports studied. Only 2 of the 72 (3%) DPM samples exceeded 20 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), (the former ACGIH exposure limit and the current California limit for DPM). Average DPM values ranged from 6–14  $\mu\text{g}/\text{m}^3$ . Average CO levels ranged from 0.6 to 5.3 parts per million (ppm), well below the NIOSH Recommended Exposure Limit of 35 ppm. Samples collected for other substances of interest ranged from very low to nondetectable. Exhaust emission testing on tugs at two airports found high levels of hydrocarbons and CO, which was related to poor maintenance.

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### NOISE EXPOSURE ASSESSMENT OF AIRPORT SCREENER DURING CHECKED BAGGAGE SCREENING.

L. Delaney, NIOSH, Atlanta, GA; R. Tubbs, M. Methner, NIOSH, Cincinnati, OH.

**Background.** Beginning in 2003, Transportation Security Administration (TSA) employees began inspecting all airline passengers and property for explosives and incendiaries. Most checked passenger bags are screened in the ramp area of the airports in areas previous not occupied by employees for a full eight-hour shift. A series of conveyor belts deliver bags to the various baggage areas where TSA employees manually load them onto a conveyor that routes each bag through an Explosive Detection System. After examination, airline personnel transfer the bags to carts attached to tugs for delivery to the aircraft. TSA employees and management were concerned about exposures to high noise levels generated from tugs, jets, conveyor belts, and baggage carousels in the checked baggage screening area. **Methods.** Four airports were selected for inclusion in the study based on size, location of screening areas, and baggage screening volume. Full-shift personal noise monitoring was conducted in the areas of concern and area noise measurements were collected to characterize the noise source. **Findings and Conclusions.** Of the 56 personal full-shift samples for noise, none exceeded the Occupational Safety and Health Administration's Permissible Exposure Limit. There were 12 instances where the 8-hr TWA exposures exceeded the National Institute for Occupational Safety and Health criterion. Generally, the noise exposures to which TSA employees were subjected during their work activities did not pose a risk for occupational noise-induced hearing loss. Major noise sources identified were the ventilation system, aircraft, airline tugs and carts, and the movement of luggage from conveyors onto the screening machines and from the machines to tables for additional inspection, or onto the airlines' conveyors for delivery to the aircraft. Recommendations to further reduce noise levels were provided to attempt to help improve communication between employees.

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### DETERMINING SOUND ATTENUATION CHARACTERISTICS OF HPDS EXPOSED TO IMPULSE NOISE. D. Carpenter, P. Parrish, D. DeCamp, S. Purdy, I. Rycbczynski, R. Shumate, A. Wells, AFIOH, San Antonio, TX.

Impulse noise presents unique problems for hearing protection use. Current hearing protective devices (HPDs) are typically assigned an attenuation rating (Noise Reduction Rating or NRR) for use in determining the attenuation characteristics with continuous noise levels. Regulatory guidance has identified impulse levels that are considered to be hazardous. However, there are no established attenuation values (NRR) for HPDs tested against an impulse noise stimulus and no defined method for the selection of appropriate HPDs for a given impulse noise level.

This study utilized an acoustic manikin (B&K Type 4128C) to measure the attenuation values of various HPDs, including earmuffs and earplugs. The manikin was exposed to controlled presentations of impulse noise in an outside environment. The HPD attenuation levels were determined by measuring the differences in sound pressure levels (SPLs) at the manikin's eardrum microphone with and without the HPDs in place. The SPLs were captured and analyzed by use of a high-speed data acquisition board utilizing software that simulates a digital storage oscilloscope, producing "snapshots" of the noise pulses. The results of this study characterized the manufacturer reported NRR of various HPDs to continuous and impulse noise.

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### ASSESSING HEALTH AND SAFETY OF HEALTH CARE WORKERS—EVALUATION OF SURVEY METHODS IN A REGIONAL MEDICAL CENTER.

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The National Exposures at Work Survey is intended to collect descriptive data from employees regarding occupational health and safety practices and perceptions, potential exposures, and interventions. The feasibility of collecting this information within the health care industry using a self-administered employee questionnaire was evaluated in a medical center. The questionnaire consisted of a core module addressing general issues (e.g., violence, stress, sharps) and 10 hazard-specific modules (e.g., hazardous drugs, anesthetic gases, sterilants). The questionnaire could be completed using either a multimodule paper version or a seamless web-based version. Approximately 750 employees were divided into three groups. "Targeted" employees (Group 1, n = 295), determined *a priori* to have potential exposure to targeted hazards (e.g., oncology nurses to hazardous drugs), received a letter with a core module and one or more hazard modules in

paper version. "Non-targeted" employees received either a letter with a paper core module (Group 2, n = 229) or only a letter with instructions for requesting the paper core (Group 3, n = 224); both of these groups were instructed to request appropriate hazard modules based upon screening questions. All three groups received instructions for alternatively accessing the web-based version. Overall, 53% of sampled employees completed the survey; response rates among common occupations ranged from 47 (pharmacy personnel) to 58% (medical supply technicians). When provided, an employee was more likely to complete the paper version rather than accessing the web-version (76 versus 24%). However, 89% of employees who received only a letter tended to choose the web-based questionnaire. If an employee was instructed to obtain hazard modules after completing screening questions in the paper core module, only 7% did so. This was not a problem in the web-based version, which was seamless with respect to additional modules. These results suggest a self-administered web-based survey is an accepted and efficient method to query workers.

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### DUPONT BLADDER CANCER SCREENING FOR POST-EXPOSURE COHORTS.

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This paper reports results of a bladder cancer screening program for pensioners/post-exposure active employees from three manufacturing groups: dyes, aramids, and elastomers with previous potential exposure to benzidine, betanaphthylamine, alpha-naphthylamine, 4-ADP, MOCA, 4-nitrophenyl, or o-toluidine. The annual screening includes 14 consecutive days of self-testing for hematuria using a chemically-treated paper strip. Urine, collected on day 1 of screening, is sent to one central laboratory facility for quantitative assessment of hematuria and cytologic classification. Participants are referred for urologic diagnostic evaluation if any of the following results are found: three or more red blood cells per high-powered field, Class 3 or greater cytology, and/or at least one day positive for hematuria during the 14-day self-testing. To date, 1012 persons from four sites have been notified, and 785 have enrolled (77.5%). Seventy-four percent of the enrollees are 60 years of age or older. This presentation will report on two cycles of screening. In year one, 28.7% of the participants tested positive and were referred for diagnostic evaluation. In year two, this percentage was 23.5. For quantitative hematuria, the percents positive were 11.3 (year 1) and 8.7 (year 2). For urinary cytology, the percents positive were 7.5 (year 1) and 5.6 (year 2). Final diagnoses among those referred for year 1 are: three incident transitional cell carcinomas of the bladder, 18.9% were "serious but treatable conditions;" for year 2, one incident and one recurrent transitional cell carcinoma of the bladder, 15.8%

were "serious but treatable." Results to date are consistent with previous screens among active employees. We maintain a high participation rate owing to personal follow-up by our team, as well as a 24/7 toll-free number that is available to all participants. Our results, we believe, will encourage reconsideration of recommended screening programs for workers who have been exposed.

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### NORTH CAROLINA: TRENDS IN AGRICULTURAL COMPLIANCE, 2000-2004.

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The Agricultural Safety & Health Bureau of the North Carolina Department of Labor has conducted inspections of farm worker migrant housing since 1990. Inspections are conducted prior to housing occupancy. These inspections are regarded as consultative visits. No fines or citations are issued as a result of these inspections; the owner/operator is required to come into compliance in order to be certified. Over 1600 sites in 88 N.C. counties are certified annually under this program.

In addition to preoccupancy inspections, compliance inspections are also conducted by this Bureau. These inspections include agricultural fatalities, accidents, complaints, and referrals. These inspections may carry citations and monetary penalties. General schedule inspections have been added to the compliance list, primarily in response to complaints and referrals regarding lack of field sanitation, OSHA PART 1928.110. Computer generated random samples were selected from the computer database of registered growers for the past three years. Approximately 60 general schedule compliance inspections are conducted annually, in addition to the other agricultural compliance inspections. Inspectors are each given a number of the general schedule inspections to complete during the months of July, August, and September. While on the inspection, questions regarding housing and pesticide application, OSHA PART 1910.1200, are made in addition to the field sanitation. If workers make complaints regarding their farmworker housing, provided as a condition of farm work, or pesticide application, the inspection is expanded to accommodate their workplace safety concerns. This poster will illustrate the Bureau compliance findings during the past five years, 2000-2004. Summary graphs and explanations are shown listing compliance findings and trends for this period. Recommendations are made concerning future compliance efforts based on these results. Comments and concerns of both farm workers and members of the grower community are provided as well, indicating the education/outreach efforts needed.

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### TRANSFORMATION OF DI-ETHANOLAMINE (EA) AND TRI-EA INTO EAS WITH LOW MOLECULAR WEIGHT IN SOLUBLE METALWORKING FLUIDS.

D. Park, Korea National Open University, Seoul, Republic of Korea; S. Kim, Wonjin Institute of Occupational and Environmental Health, Seoul, Republic of Korea.

Alkanolamines or ethanolamines (EA)-triEA (TEA), di-EA(DEA), and mono-EA(MEA) are used in soluble metalworking fluids (MWFs) to stabilize pH or inhibit corrosion. These EAs have similar chemical structure except for molecular weight. Two kinds of experimental studies were conducted to examine if EAs were vaporized and transformed to other EAs with lower molecular weight. Vaporization test using thermostat bath found that only MEA could be vaporized at a temperature lower than 60°C. The vaporization rate of MEA increased markedly from 0.19 mg/m<sup>2</sup>.min at 23.5°C to 8.04 mg/m<sup>2</sup>.min at 60°C. This result indicated that MEA might be vaporized even at work operations where MWFs are running around room temperature. Closed chamber test that was used to test the vaporization and degradation of EAs under high temperature found that most of MEA injected was completely recovered. However, only 13.32% of DEA and no TEA was recovered. EAs that never injected were newly detected, which concluded that EAs with high molecular weight could be transformed to new EAs with low molecular weight due to degradation by extreme heat. Further field study is needed to identify physical factors that can cause the formation of new EAs in work conditions or operations generating extreme heat.

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### ASSOCIATION OF AIR TOXICS EXPOSURE AND ASTHMA HOSPITALIZATION IN NEW JERSEY.

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*Withdrawn*

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### CARBON DIOXIDE INFILTRATION INTO A HOME.

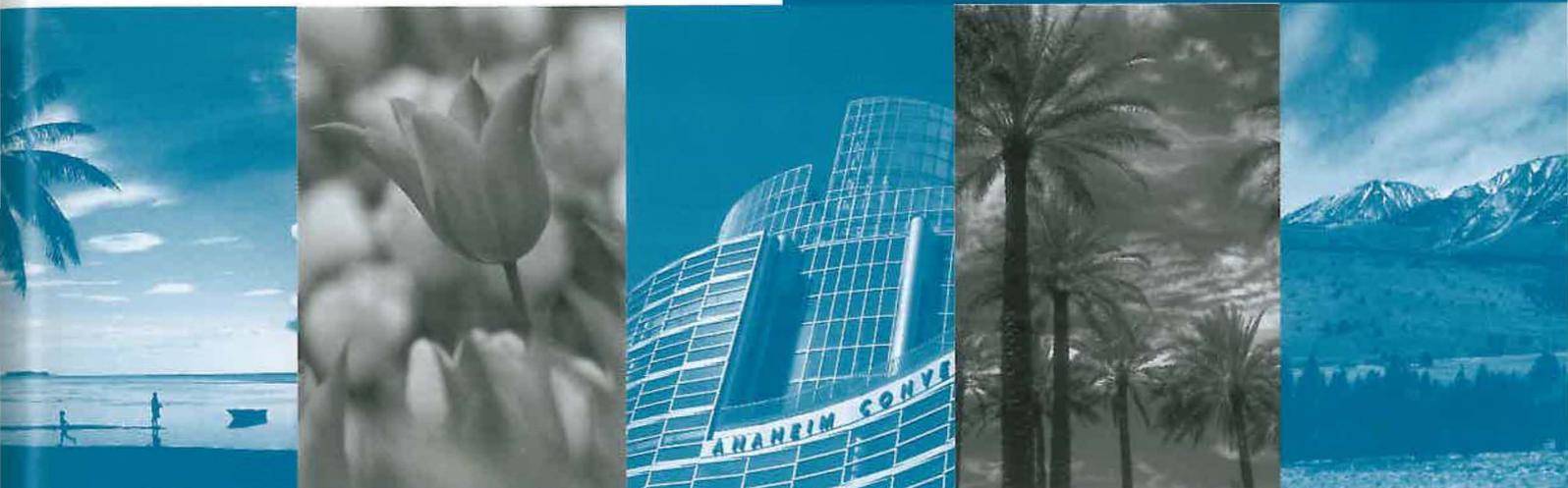
J. Harrison, C. Rao, L. Benaise, NIOSH, Morgantown, WV.

NIOSH received a technical assistance request in December 2003 to assist with the investigation of a home built above an abandoned coal mine and on a reclaimed surface mine. The residents reported new-onset shortness of breath, lightheadedness, dizziness, poor concentration, and blurry vision while in the basement. Their symptoms resolved within minutes after leaving the basement. Investigators found an oxygen-deficient environment in the basement and crawlspace areas of the home. Carbon monoxide and methane

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