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INVESTIGATION OF EXPOSURES IN AN INDUSTRIAL PRINTING FACILITY. M. Finley, E. Page, NIOSH, Cincinnati, OH.

Investigators from the National Institute for Occupational Safety and Health (NIOSH) responded to a confidential request for a health hazard evaluation from printing press operators at a large Midwestern printing facility. These employees were experiencing symptoms they believed were related to their exposure to inks and solvents. NIOSH investigators visited the facility to characterize workers' exposures, evaluate symptoms, and provide recommendations to minimize hazardous exposures. During the survey, personal breathing zone air sampling was conducted for trimethylbenzenes and trichloroethylene (results ranged from 0.3 to 9.5 parts per million (ppm) and not detected to 26 ppm, respectively). The NIOSH recommended exposure limit (REL) for both of these chemicals is 25 ppm as an 8-hour time-weighted average. Only one trichloroethylene result exceeded the REL. Area air samples were collected for 2-butoxyethanol, carbon monoxide (CO), and ozone. Concentrations of 2-butoxyethanol ranged from 0.2 to 1.2 ppm, below the REL of 5 ppm, while CO results ranged up to 17 ppm, below the REL of 35 ppm. Ozone was not detected. Noise dosimetry revealed that 12 of 13 employees monitored exceeded the NIOSH REL of 85 dBA. Questionnaires were administered to press operators and office workers and these two departments were then compared on age, tenure, gender, smoking, atopy, exposures, and outcome variables. There was a significantly higher prevalence of rash/skin irritation on hands or arms, and burning/runny nose among press operators. There was also a higher prevalence of work-related wheezing, burning/watery eyes, and sore throat among press operators, but this was not statistically significant. NIOSH recommendations include instituting a hearing conservation program, replacing certain solvents, enforcing the use of appropriate gloves, and covering unused solvent containers. Future activities include additional air sampling, audiometry, and biological monitoring to investigate the synergistic relationship between exposure to noise and solvents.

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OCCUPATIONAL EXPOSURES DURING CEMENT TILE CUTTING WITH PORTABLE SAWS. R. Sollberger, R. Tubbs, R. McCleery, C. Achutan, M. Rodriguez, NIOSH, Cincinnati, OH.

NIOSH conducted a health hazard evaluation during cutting of cement tiles at a home construction site to assess worker exposures to noise, carbon monoxide (CO), respirable and total dust, and respirable silica. Tiles consisted of up to 75–80% by weight crystalline silica and were cut using portable gas-powered saws. On two consecutive days, full-shift PBZ samples were collected on eight workers to assess noise and CO exposures, and on 16 to 19 workers for respirable dust, total dust, and silica. A questionnaire administered to the workers asked for job information and health symptoms. During the evaluation, employees wore hard hats and safety glasses; some also wore disposable dust respirators, but none used hearing protection. All workers evaluated exceeded the NIOSH Recommended Exposure Limit (REL) for noise of 85 dBA, for an eight-hour time-weighted average (TWA). The respirable crystalline silica exposures ranged from 0.03 mg/m^3 to 0.32 mg/m^3, with 88% exceeding the NIOSH REL of 0.05 mg/m^3. Thirteen of the 16 (81%) workers' silica exposures exceeded the OSHA Permissible Exposure Limit, and 75% exceeded the ACGIH Threshold Limit Value. Total dust exposures ranged from 0.71 mg/m^3 to13.01 mg/m^3 and respirable dust exposures ranged from 0.23 mg/m^3 to 2.31 mg/m^3. One worker exceeded the NIOSH ceiling level of 200 ppm for CO, but none exceeded the NIOSH REL-TWA of 25 ppm. Fourteen of the 24 workers (58%) were experiencing respiratory symptoms that could be associated with workplace exposures to dust. Many workers lacked knowledge about the presence of silica in the tiles and were not familiar with the hazards associated with exposure to respirable silica. Recommendations were made to improve training, implement engineering controls to reduce noise, dust, and silica exposures, and use personal protective equipment.

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MDI CONCENTRATIONS DURING APPLICATION OF SPRAY-ON TRUCK BED-LINERS. D. Almaguer, R. Streicher, G. Burroughs, M. Ernst, R. Kovein, S. Shulman, NIOSH, Cincinnati, OH.

A study was conducted to evaluate potential worker exposures to 4,4'-diphenylmethane diisocyante (MDI) during the application of spray-on truck bed-liners. The Washington State Department of Labor and Industry recently observed MDI exposures in this industry and expressed concerns to NIOSH about excessive occupational asthma claims. The spray-on bed-liner industry is rapidly growing and dominated by small business entities. It has been estimated there are approximately 3000 bed-liner shops in the U.S. The process is analogous to undercoating and involves the application of an aerosolized two-part polyurethane or polyurea coating to the surface and walls of pick-up truck beds to provide a protective non-skid coating. Part A is a polymeric diisocyanate with varying percentages of MDI monomer, MDI prepolymer, and polymeric MDI. Part B is a polyol resin that reacts with the diisocyanate. The two components are pumped to a spray gun mixing chamber and sprayed at sufficient velocity to cause atomization. MDI samples were collected at six spray-on bed-liner facilities to determine MDI concentrations within the spray booths and adjacent areas. Samples were collected at a flow rate of 1 liter per minute (lpm) according to NIOSH Method #5525. The sampling train consisted of an impinger containing a solution of 1-(9-anthracenylmethyl)piperazine (MAP) reagent in butyl benzoate followed by a 37-mm two-piece filter cassette containing a glass fiber filter impregnated with solid MAP. Preliminary results indicate that MDI concentrations within the facilities ranged from non-detectable to 5.2 mg/m^3, some exceeding the OSHA ceiling limit of 0.2 mg/m^3. Applicators wore supplied-air respirators. These results show that ventilation must be improved before allowing relaxation of personal protective equipment requirements.

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EXPOSURE ASSESSMENT: AN EVALUATION OF BENZENE FROM THE APPLICATION AND USE OF SPIKED PENETRATING SOLVENTS. L. Burrelli, M. Nealley, M. Plisko, J. Spencer, Environmental Profiles Inc., Baltimore, MD.

Mechanics commonly use petroleum distillate-based solvents to penetrate and dislodge rusty bolts, nuts, and other metal parts during maintenance activities. Some commercial preparations of the petroleum-distillate product have been reported to contain varying quantities of benzene. The purpose of this study was to determine the exposure of a mechanic and his helper to benzene vapors when using commercially-available petroleum distillate solvents spiked with various concentrations of benzene. In order to evaluate these exposures, three batches of penetrating solvent were spiked with known weight percentages of benzene. Specifically, preparations of the solvent/benzene solutions were made in approximate 1, 7, and 30% concentrations of benzene by weight. The actual weight percentages of the prepared mixtures were determined by laboratory analysis. The results demonstrate that the mechanic and helper were not exposed to benzene in air at levels greater than the current OSHA eight-hour TWA permissible exposure limit of 1 part per million (ppm). Additionally, 27 air samples were collected for 15-minute short-term exposure limit (STEL) determination from the mechanic and helper during the entire study. One sample of the 27 collected and analyzed marginally exceeded the OSHA 15-minute STEL of 5 ppm. The one sample that exceeded this limit was reported at 5.03 ppm and was collected from the mechanic during the work task associated with the use of the 6.8% solvent/benzene.

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USING WORK PRACTICE SIMULATION AND A PHYSICAL-CHEMICAL MATHEMATICAL EXPOSURE MODEL FOR DETERMINATION OF OCCUPATIONAL EXPOSURE. M. Plisko, J. Spencer, L. Burrelli, Environmental Profiles Inc., Baltimore, MD.

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