on-line evaluation. As the deadline for the training approaches, the course evaluation responses are expected to increase. Preliminary results indicate that there is no significant difference in responses by job classification as to the preference of WBT design features. Preliminary results also indicate, without reference to job classification, that the three WBT design features deemed relatively most important are the provision of job resources, ability to take the on-line quiz at any point during the training, and relevancy of the training to the job.

437.

A FORUM ON SAFETY AND HEALTH TRAINING TIPS FOR THE INDUSTRIAL HYGIENIST. J. Jarrell, University of Cincinnati, Cincinnati, OH; J. Dimos, Consultant, Chicago, IL; C. Lewis, Kellogg, Brown & Root, Houston, TX; J. Esler, Eastman Kodak Company, Rochester, NY

Industrial Hygienists, within corporate structures as well as consultants to corporations and small businesses, are called upon to present or arrange for worker safety and health training. Many, however, have not received instruction regarding effective training principles. In this forum, five 20-minute presentations will cover how adults learn, effective instruction methods, encouraging trainee participation, an example of an unique training format, and how to choose distance-learning formats for effective training.

Once the trainer understands how adults learn, he or she will have a better grasp on what training tools are needed for the effective presentation of his or her training to meet desired learning objectives.

As new regulations are promulgated, training requirements are becoming more specific in content as well as in the method of instruction. It is important, then to be able to select the appropriate method of training to fulfill these requirements and still address the needs and abilities of your training audience. This presentation will provide descriptions of several different training methods and describe the advantages and disadvantages of these methods.

Are you tired of training sessions where your trainees just sit there and evidence no signs of life? This presentation will provide any trainer with ideas and examples of how to get your trainees up and out of their chairs and participating in the learning process.

By its end, this Forum will give you, the trainer, a measure of each ingredient that should go into the training you cook up. You are told to combine adult learning theory, clear objectives, trainee participation, excitement, flexibility and more. How do you mix these all into an appealing offering that feeds your participants what they need in a form they can digest? You can use my favorite recipe.

438.

ELEMENTS OF EFFECTIVE CONFINED SPACE TRAINING. P. Grogin, J. McClory, E. Baylosis, Los Alamos National Laboratory, Los Alamos, NM

At Los Alamos National Laboratory, confined space training is broken out into specialized classes or sessions of varying size to maximize effective communication and interaction between instructors and trainees while focusing resources where they are most needed. Initially, trainees are required to attend a live, awareness-level class that presents criteria for confined spaces, primary and secondary hazards, roles and responsibilities of team members, and an overview of rescue planning and the permit system. Throughout the class, confined space fatalities that illustrate improper hazard identification and/or control measures are presented and discussed. Detailed dissection of one or more occurrences allows trainees to identify contributing factors and potential methods of prevention. The instructor poses frequent questions about potential hazards, changing conditions, and foreseeable emergencies in a manner that encourages trainees to conclude, on their own, that hazards and foreseeable emergencies must be considered prior to entry. Refresher awareness-level training is required every three years, and may be completed as live training or as an on-line self study with a quiz. Smaller specialized classes or sessions offer training in the use of monitoring equipment, proper completion of entry permits, and evaluation of suspect confined spaces. Follow-up classes or sessions may be formal or informal as long as documentation needs are met. Minimum documentation consists of a summary of course or session content, a roster signed by those who attended, and instructor qualifications. Proficiency evaluation forms designed for specific types of equipment are available to ensure that demonstration of proficiency is documented on a trainee by trainee basis. Presentation of confined space training in separate classes of varying size: 1) conserves resources by allowing trainees or their managers to select the specialized training they need, and 2) allows a level of interaction that enhances effective health and safety communication.

Community Environmental Health and Safety

Papers 439–442

439.

COUNTRY PROFILES AND NATIONAL SURVEILLANCE INDICATORS FOR THE EVALUATION OF THE STATE OF OCCUPATIONAL HEALTH AND SAFETY IN EUROPE. T. Kauppinen, J. Rantanen, J. Toikkanen, K. Kurppa, S. Lehtinen, T. Leino, Finnish Institute of Occupational Health, Helsinki, Finland

Indicators are an important tool for information steering which is increasingly complementing traditional normative governance methods based on regulations, enforcement, implementation, and inspection. The Finnish Institute of Occupational Health (FIOH) was requested by the European office of the WHO to prepare a proposal on country profiles and key indicators on occupational health and safety (OH&S) for European use. The proposal was derived from a conceptual model of OH&S taking into account the relevance, validity, comparability, and feasibility of indicators. The proposed core set of 16 indicators covered OH&S policy and infrastructure (prerequisite indicators: ratification of ILO conventions, human resources in OH&S at workplaces, human resources in labor safety inspection, human resources in occupational health services, coverage of occupational health services), working conditions (exposure indicators: high level noise, handling of dangerous substances, asbestos consumption, pesticide consumption, heavy loads, working at very high speed, working at least 50h/week), and health outcomes (effect indicators: fatal work accidents, other work accidents, occupational diseases, perceived work ability). Data on proposed indicators were not available from all European countries but lacking data can probably be made available with reasonable effort by national questionnaire-based surveys or joined expert assessments utilizing uniform methodology to improve comparability of data across countries. The European meeting of WHO Collaborating Centres in Occupational Health accepted this approach in September 2001, decided to construct country profiles including available data on OH&S indicators, and to study the feasibility of further data collection in cooperation with WHO Collaborating Centres, agencies of the European Union, ILO, and other interested parties.

440.

INTERVENTION TO CONTROL TAKE-HOME BERYLLIUM EXPOSURES OF MACHINE SHOP WORKERS. W. Sanderson, L. Taylor, D. Booher, NIOSH, Cincinnati, OH; P. Henneberger, NIOSH, Morgantown, WV

A survey of beryllium contamination on workers' hands and inside their personal vehicles at a machine shop where workers had developed chronic beryllium disease (CBD) showed that they were likely to have carried beryllium on their bodies and clothes into their homes. These take-home beryllium exposures could potentially not only increase the workers' risk for CBD but also put their families at risk.

Subsequently, the company installed lockerrooms, provided workers uniforms and shoes to wear while in the plant, and required them to shower and change into their take-home clothing before leaving the plant. Although all workers followed the clothing policy, very few if any were showering before leaving work. The company also reduced the airborne and surface levels of beryllium inside the plant. To

determine the effectiveness of these changes in reducing beryllium migration from the plant, wipe samples were collected from workers' hands, necks, and shoes on two occasions: immediately after the changes were made and one year later. The workers' vehicles were cleaned immediately after the changes to provide a baseline beryllium level and the same vehicles were sampled one year later. The samples were analyzed for beryllium content by inductively coupled argon plasma-atomic emission spectroscopy and compared to the measurements before the intervention.

One year after the intervention, the beryllium concentrations were over 40% lower on vehicle seats and over 75% lower on vehicle floors, while concentrations on workers hands were only 25% lower. The geometric mean beryllium concentrations on workers hands, necks, and shoes were 3.4, 0.6, and 5.7 μg, respectively. These data indicate that attempts to reduce take-home beryllium were somewhat successful, but had not completely eliminated the migration of beryllium from the plant. Additional effort, including employee education about take-home risks, is needed to ensure that workers shower before going home.

441.

A COMPARISON OF 8 PREFERRED/RECOMMENDED EPA ATMOSPHERIC DISPERSION MODELS USED TO ESTIMATE POTENTIAL HEALTH RISKS FROM PROCESS EMISSIONS. R. Clinkenbeard, T. Hall, Oklahoma University, Oklahoma City, OK

A Comparison of 8 Preferred/Recommended EPA Atmospheric Dispersion Models Used to Estimate Potential Health Risks from Process Emissions

The Environmental Protection Agency has proposed linking Tier I reported facility emissions and atmospheric emission modeling to estimate potential health risks from process emissions. The Environmental Protection Agency has designated 8 atmospheric dispersion models as preferred/recommended Air Quality Models and also has designated 31 models as Alternative Models (Appendix W of 40 CFR Part 51). The preferred/recommended models consist of: Buoyant Line Plume (BLP), Industrial Source Complex Long Term (ISCLT3), Offshore and Costal Dispersion Model (OCD), Rural Air Model (RAM), CALINE 3, Climatological Dispersion Model (CDM), Urban Airshed Model (UAM-IV), Complex Terrain Dispersion Model Plus Algorithms for Unstable Situations (CTDM-PLUS). These are the models that will be used to estimate process emission-related health risks. We have evaluated each of these models to determine their sensitivity and specificity with respect to health risk estimates. This evaluation required the creation of 6 hypothetical scenarios with circumstances consisting of differing meteorological conditions, stack height, receptor location, and rate of pollutant production. The model evaluation criteria were: overall receptor exposure values, convenience of use, and data input requirements. The results demonstrate that there is no universal model applicable for all scenarios and applications and agreement between models ranged from acceptable to poor.

442.

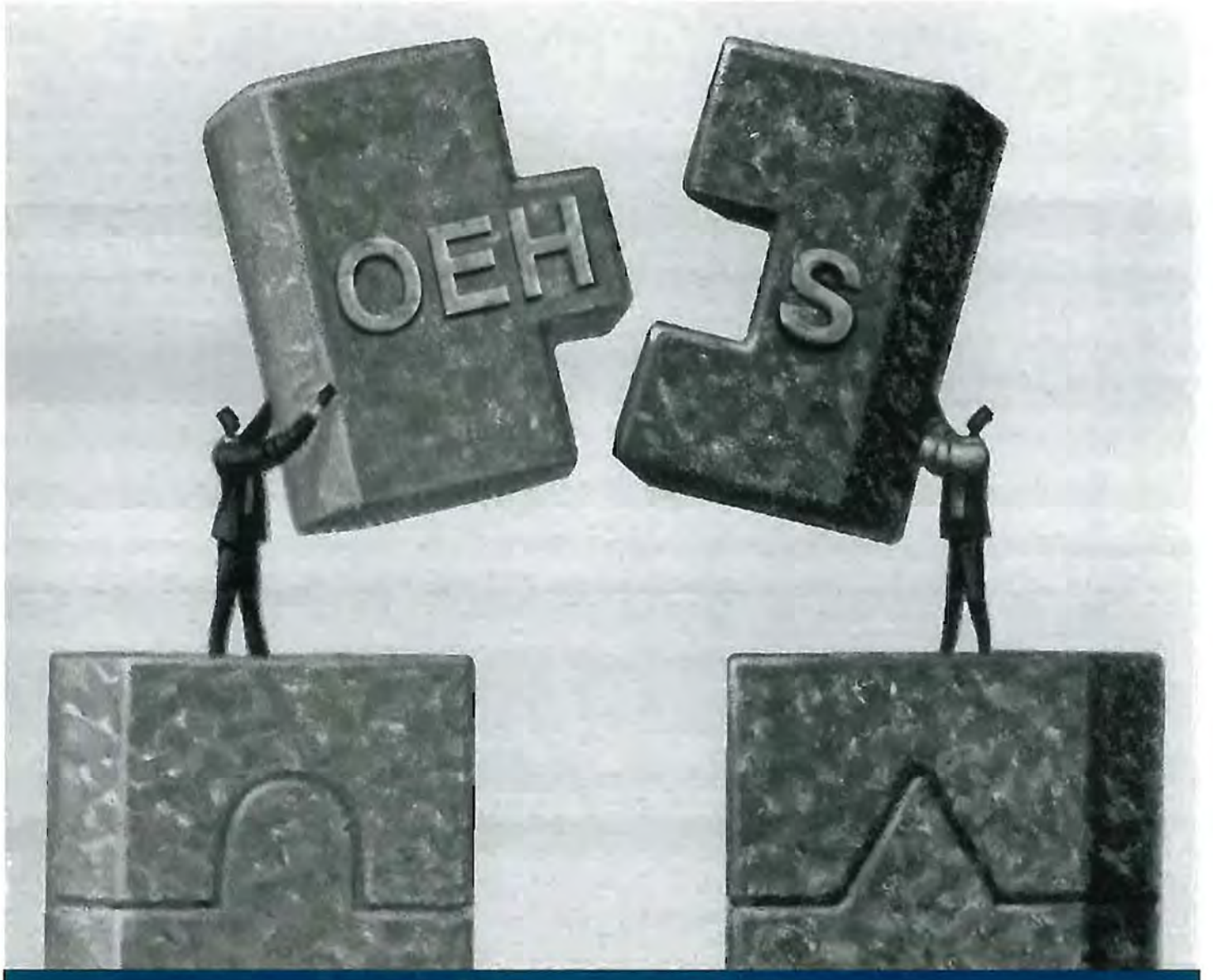
THEMATIC MAPPING ANALYSIS OF SPATIAL DISTRIBUTIONS OF ASBESTOS ACTIVITIES ACROSS BOSTON'S NEIGHBORHOODS - A NEW METHOD FOR MONITORING AN OLD PROBLEM. L. Bethune, P. Shoemaker J. Shea, Boston Public Health Commission, Boston, MA

From 1985 to the present, the City of Boston Public Health Commission's Environmental Health Office has monitored the incidence of illegal asbestos removals, asbestos-related violations, and legally permitted residential asbestos abatement projects. By using Geographic Information Systems (GIS), a thematic map was created to investigate the distribution of illegal asbestos removal, asbestos violations, and legal asbestos work compared with the population density of Boston's seventeen neighborhoods. The purpose of this analysis was to examine patterns of spatial distribution in legal and illegal asbestos activities against a background of know demographic, socioeconomic, and environmental factors for each neighborhood. The residents living in the communities of Roxbury, Dorchester, and Mattapan are approximately 75 percent people of color. The minority population of the remainder of Boston is approximately 25 percent. While previous GIS work has shown that pediatric lead poisoning cases, pediatric asthma cases, automotive repair shops, junk yards, and waste processing facilities cluster in Roxbury, Dorchester, and Mattapan, the incidence of legal and illegal asbestos removal and asbestos violations is relatively evenly distributed throughout the city. For example, Roxbury Dorchester, and Mattapan has the highest annual rate of lawful asbestos abatement project permits issued at 0.74 projects per 1,000 residents, 54% more than in Boston outside these neighborhoods. The rate of identified illegal asbestos removal and asbestos hazard exposure in these neighborhoods was 0.0344 per 1000 residents, only 12% higher than the rest of Boston. The highest rates of illegal asbestos removal and complaints occurred in affluent Allston/Brighton and Jamaica Plain respectively. Although no immediate patterns of disproportionate distribution were apparent, thematic mapping of these and other data allow the program to identify and target cluster areas for targeted community outreach and public education around this and other environmental public health issues.

The Premier Conference for Occupational and Environmental Health and Safety Professionals

POWERFUL PARTNERSHIPS

Leveraging the power of collaboration to expand knowledge



ABSTRACTS

aihce

American Industrial Hygiene Conference & Expo

Cosponsored by AIHA and ACGIH®

June 1–6, 2002, San Diego Convention Center, San Diego, California

2002 Abstract Index by Session Topic

PF 101 Agricultural Health and Safety

Papers 1–6

1.

RELATIONSHIPS BETWEEN WORK EXPOSURE AND RESPIRATORY OUTCOMES IN POULTRY WORKERS.

S. Kirychuk, J. Dosman, P. Willson, L. Dwernychuk, University of Saskatchewan, Saskatoon, SK, Canada; J. Feddes, A. Senthilselvan, C. Ouellette, University of Alberta, Edmonton, AB, Canada

A pilot study was conducted on 74 poultry barn workers in Western Canada during the winters of 1998–2000. General respiratory health, current, chronic and work related respiratory symptoms; general work duties, and work-site factors were ascertained, pre-exposure, by questionnaire. Personal airborne exposure levels and changes in symptoms and lung function were measured across the work-shift for all workers. Workers were classified according to the type of poultry operation (floor based, n=53; cage based, n=13) in which they worked. There was no significant difference in daily hours spent in the barn between those who worked with caged poultry (5.41±2.35 hours) and those who worked with floor-based poultry (4.42±2.48 hours). Age of birds was 47.10±58.36 days for floor based versus 155.91±63.01 days for cage based facilities. There were no significant differences in personal environmental measurements between cage-based and floor-based facilities (ammonia 13.22±13.70 ppm, 17.34±16.35 ppm; total dust 5.74±4.85mg/m^3, 10.01 ±8.84 mg/m^3; endotoxin 6046±6089 EU/m^3, 5457±5934 EU/m^3 respectively). There were no significant differences in across work-shift change in pulmonary function indices between workers from cage and floor-based operations. For the entire sample total dust dose (work hours/day x total dust) significantly correlated with across-shift change in FEV_1, whereas endotoxin dose and ammonia dose did not. Stocking density was significantly correlated with average ammonia (ppm, p=0.002) and ammonia dose (ppm x work hours/day; p=0.004) in floor based operations and with total dust (particles/ml, p=0.002) in cage based populations. Stocking density was also significantly correlated with chronic cough (p=0.003) and across work-shift cough (p=0.05) and chest tightness (p=0.06) for workers from floor based operations; and with phlegm when working (p=0.018) and chest tightness across the work-shift (p=0.004) for workers from cage based operations. Type of poultry production operation and therefore type of work exposures appear to significantly impact symptoms experienced by workers exposed to these atmospheres.

2.

DUST GENERATION SYSTEM FOR AGRICULTURAL SOIL DUST.

K. Lee, R. Domingo-Neumann, R. Southard, UC Davis, Davis, CA

Agricultural workers are prone to exposure to mixed dust of inorganic and organic compounds. Diverse working conditions and operations in agriculture make direct measurements of the mixed dust exposure difficult. This study was conducted to develop a new dust generation system to determine possible exposure potency indicators of soil samples. The dust generator consists of a blower, a rotating chamber and a settling chamber. The rotating chamber has inner baffles to provide sufficient agitation of the samples while the chamber is rotating. A blower provides air into the rotating chamber, and the suspended dust is moved to the settling chamber through a perforated pipe. A small fan inside the settling chamber helps maintain suspension of the dust. Various size fractions of dust are sampled on filters suspended in the chamber via outlet ports and attached pumps. Air pressure is released through a filter plate mounted on the wall of the settling chamber. Various operating conditions were evaluated: air intake from blower, speed of rotation, soil mass and sampling time. To evaluate the characteristics of dust from the system, we collected dust samples from agricultural fields while the soil was prepared for