cessing. HSE is currently producing guidance for the aluminum recycling industry and it is likely that this infomation will be equally applicable to the industry overseas.

Because of public concern, we also sampled at a municipal waste incinerator and at a landfill site which buries contaminated ash from incinerator filter bags. Other analyses were made of dust from incinerator sites and of pulverised fuel ash from a local power station. Reassuringly low levels of dioxin were measured.

Dioxins are an emotive subject and the levels measured need to be put into persepctive by considering ambient levels, temporal changes in industry, and the amount ingested in the diet.

We have identified the highest exposures in U.K. industry and our guidance is aimed at reducing these levels as far as is reasonably practicable.

238.

ENVIRONMENTAL HEALTH HAZARDS OF ASBESTOS IN SCRAPES OF OLD SHIPS IN MARDAN AND SWABI, NORTH WEST PAKISTAN. N. Jehan, I. Ahmad, S. Hamidullah, University of Peshawar, Peshawar, Pakistan

During the last one decade global ship braking industry has increasingly shifted to poor Asian countries-particularly Pakistan. The poor and illiterate people are already at higher risk of environmental health hazards caused by the unsafe handling of natural asbestos occurring in the foothills of Himalayas in North Pakistan. About 600 patients of malignant mesothelioma and asbestosis, including the mining workers, women and children's, were registered last year in the Lady Reading Hospital Peshawar, North Pakistan.

In this paper I will present the environmental health hazards caused by asbestos found in the scrapes of old ships in Mardan and Swabi located about 65 km east of Peshawar. This material used to come from Europe and America and dismantled on Karachi shipyard and distributed throughout the country. In Mardan and Swabi this material is dumped in open air in thickly populated area. Small cutting machines have been installed in open air on the main roadside. One can see thick layer of asbestos dust on the food, plants and crops and in the air. Children are playing with it. The quantity of asbestos dust present in the air is 300 times more than the permissible limit. The most interesting component of this scenario is the first ever introduction of beautiful furniture-including tables, chairs, wardrobes and doors-made of asbestos. Thousands of different items have been sold and already distributed throughout the country. According to the data available from the local hospitals almost 30% of the total population in Mardan and Swabi are suffering from different lung diseases including asthma and cancer. It is expected that in the near future the lung diseases may be epidemics in the areas under investigation.

239.

IMPLEMENTATION OF A COMPREHENSIVE REPETITIVE STRESS INJURY PREVENTION PROGRAM IN A LARGE OIL EXPLORATION AND PRODUCTION COMPANY IN ANGOLA. D. Brown, Chevron Overseas Production, Inc., San Ramon, CA

In 2000, a study was conducted to assess the scope of discomfort in office workers and computer users in a large oil and gas production company located in Angola. The assessment consisted of office visits, interviews, and a discomfort survey. Assessment participants constituted three distinct groups of computer users: resident employees working a 5-day-per-week schedule (5/2); rotational employees working onshore in a camp environment working 28 days on, 28 off (28/28); and rotational employees working offshore either 14/14 or 28/28. Among the findings was that the highest incidence of discomfort occurred in employees working the traditional 5/2 schedule.

In 2001, the company began implementation of a comprehensive repetitive strain injury (RSI) prevention program. Implementation was part of a corporate-wide initiative utilizing the best practices available to prevent RSIs. Risk assessment would be performed annually for each worker and targeted interventions would be based on classification into a low, medium or high risk category for RSI. Risk category was to be determined and initial educational material delivered using a computer-based assessment tool. Interventions consist of education, ergonomic evaluation by certified evaluators, equipment and software improvements, and medical intervention. Significant challenges were encountered gaining locally the necessary medical expertise about RSIs, translating and adapting use of the risk assessment tool, and ensuring that necessary furniture and equipment could be acquired in a timely manner. Additionally, cultural differences needed to be accounted for and behavior changes were also essential:

· Supervisors asking employees whether they feel discomfort at work.

· Employees reporting discomfort early before serious symptoms develop.

· Employees at all levels positively reinforcing healthy behaviors, including proper workstation arrangement and body positions, taking frequent breaks, and reporting discomfort.

240.

STRENGTH DEMANDS OF LINE HANDLERS ON THE PANAMA CANAL. S. Gallagher, R. Unger, NIOSH, Pittsburgh, PA

Vessels transiting the Panama Canal are guided through the locks using locomotives that are connected to the vessels by means of wire ropes or cables. Crews of line handlers must attach these cables to bitts on the vessel. This task entails high strength demands and results in a high incidence of low back pain. As a result, the Panama Canal Commission requested that the National Institute for Occupational Safety and Health (NIOSH) evaluate the strength requirements of the job and strength capabilities of line handlers. Task demands were evaluated using a digital force gauge during transit of a Panamax vessel through the Miraflores and Pedro Miguel locks. Capping the bow bitts consistently resulted in the highest force demands, averaging 1144 N of force. Capping the stern bitts required less force (1034 N), while capping the midships bitts were least stressful (averaging approximately 311 N). Individual and team pulling strengths of a crew of line handlers were evaluated using three angles of pull. Individual strengths were greatest when pulling upwards (average of 512 N ± 222.5), followed by pulling downwards (average of 467 N ± 133.5), and was least when pulling horizontally (average of 401 N ± 178). In team strength tests, arranging the crew in order of stature was important. When pulling upwards, arranging the crew from shortest (in front) to tallest increased strength by 12.5% compared to the opposite arrangement. When pulling downwards, having the tallest in front increased strength generated by the team by 25% compared to the opposite order. Order of the team by stature had no effect on horizontal pulls. Data suggest that capping bow and stern bitts on Panamax vessels requires at least four and perhaps as many as five line handlers in order to meet strength demands of the task.

241.

HEALTH STATUS IN WORKERS OCCUPATIONALLY EXPOSED TO MOLYBDENUM AND ITS COMPOUNDS. E. Babayan, Institute of General Hygiene and Occupational Diseases, Yerevan, Armenia

Aims: To study the character of health disorders in individuals occupationally exposed to molybdenum dust.

Material and Methods: The complex medical examination involved 480 workers from the enterprises of ore enrichment, 1 facility producing the metallic Molybdenum and 2 plants applying Molybdenum as raw material. The statistic material is analyzed on the disease prevalence in workers complicated with temporary loss of working ability, as well as the results of annual preventive medical checkups. Functional, biochemical, cytogenetic and spermatologic studies were done; Molybdenum dust content in the working-zone air was determined.

Results: In the workers examined there was significantly high frequency of cases of rhynites, laryngites, phayngites, disorders of external breath. The cases are revealed of occupational dusty bronchitis and pneumoconiosis. As to the CNS, there was the astenization, vegetodistony, in CVS: changes of ECG and vessel rheography, hypertonic reactions, signs of coronarospasms. Many workers had arthritis, artrosis, artralgias, myosites, neurites of the peripheral nerves and ganglia, liver enlargement with disorder of its functions. The

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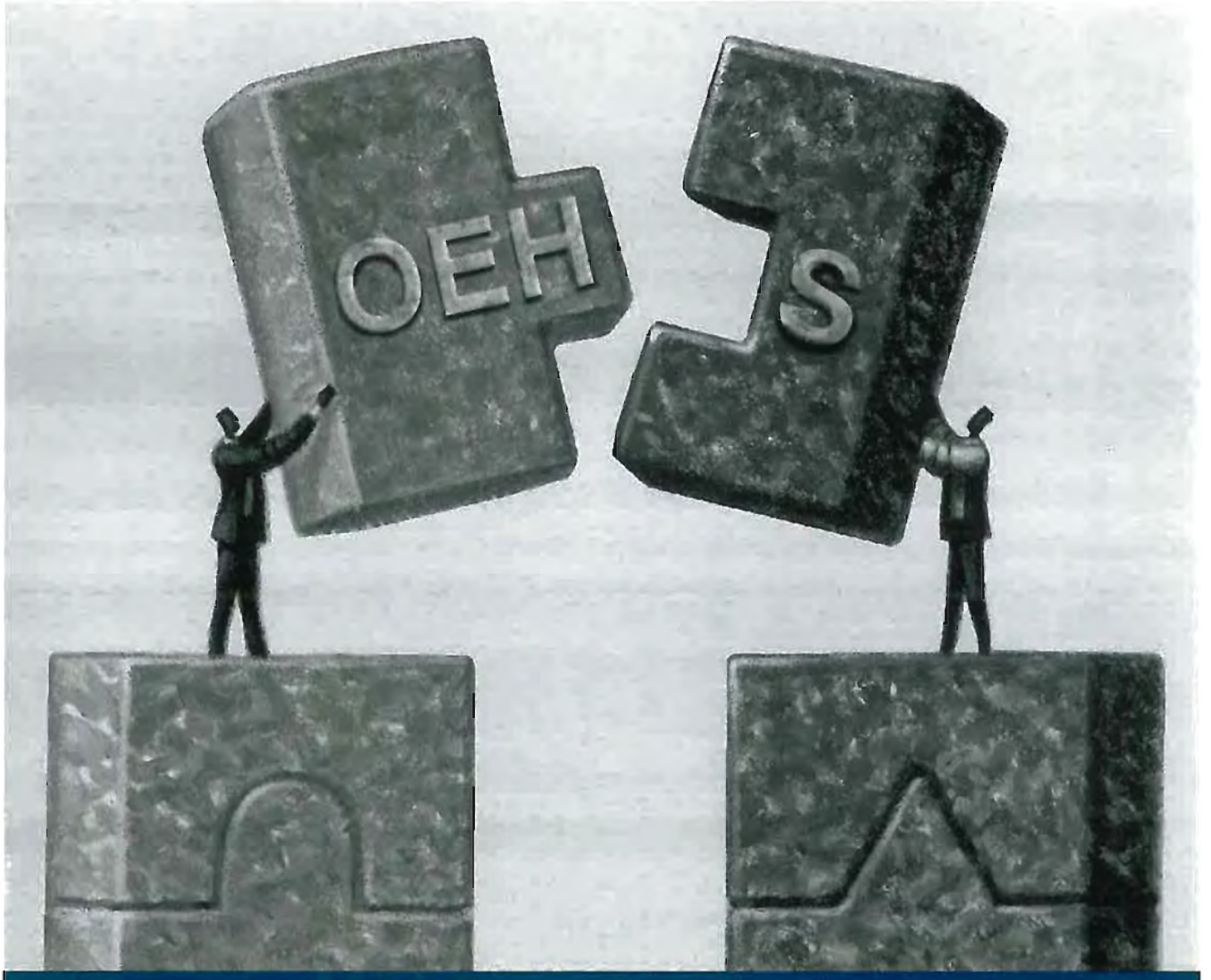

ABSTRACTS

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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