penicillioides grew in detectors in damp microenvironments or on damp surfaces. The same xerophilic fungi failed to germinate or grow in buildings that had successfully undergone adequate restorative drying. The hydrophilic fungus *A. alternata* grew in wet (RH>95%) microenvironments. Periodic and consistent decline of RH to 60% or less in otherwise humid microenvironments appeared to inhibit spore germination in detectors. While fungal detectors will not replace the standard uses of dew point and moisture meters, the detectors provide inspectors with an additional tool for investigating mold growth problems in buildings.

Podium 102. Balance Issues and Upper Extremity Potpourri

Papers 7–12

7.

SLIPS, TRIPS, AND FALLS IN HOSPITAL WORKERS—PILOT OUTCOMES. T. Courtney, H. Wellman, D. Lombardi, Liberty Mutual, Hopkinton, MA; G. Sorock, Johns Hopkins University, Baltimore, MD; J. Collins, J. Bell, NIOSH, Morgantown, WV; L. Wolf, BJC Healthcare, St. Louis, MO; R. Gronqvist, Finnish Institute for Occupational Health, Helsinki, Finland.

The health services sector is the largest employer in private industry (~10 million workers). In 2001, more health care workers were injured than workers in any other sector, and slips, trips, and falls (STF) accounted for the largest proportion of lost time injuries (21%). The incidence rate of same level STF injuries in hospitals was almost twice that of private industry (38.6 vs. 20.8 per 10,000 FTEs). A case-crossover field study was initiated to describe the circumstances of hospital worker STF and evaluate the contribution of potential transient risk factors. Health-care workers, who reported a STF to the occupational health department in five U.S. hospitals, were recruited. Fifty-nine subjects were interviewed using a structured telephone questionnaire. Eighty-six percent were women with a mean age (range) of 46 (19–67). Nurses (32%) and maids and housemen (12%) were the most frequently reported occupations. Fifty-one subjects (86%) fell: 55% after slipping, 41% after tripping. Liquid contaminants (e.g., water, cleaning solutions) were noted in 34% of the events. Fifty-nine percent of the STF occurred at a transitional area: wet to dry (31%), one type of floor to another (22%), or uneven surfaces (19%). Ninety-three percent of subjects were injured. Contusions (23% of injuries), strains and sprains (22%), and fractures (9%) were typical. To evaluate each potential transient risk factor, exposure for each worker at the time of their STF was compared with their usual frequency of exposure in the prior work month. Contaminated floors, unfamiliar pathways, rushing (e.g., responding to urgent patient needs), carrying atypical loads, and distraction were encountered more frequently at the time of injury than in the prior work month. Prevention resources should focus on improved control of contaminants and improved transitions between surfaces and conditions.

8.

POSTURAL STABILITY EFFECTS IN LOW-SEAM MINING TASKS. J. Gordon, T. Sobeih, A. Bhattacharya, P. Succop, University of Cincinnati, Cincinnati, OH; L. Kincl, University of Oregon, Eugene, OR.

Performing work in underground low-seam mines requires working on slippery surfaces under poor lighting conditions with restricted postures that may cause a potential loss of stability/balance, especially during material handling tasks. The purpose of this study was to determine the effect of work surface properties, task type, and environmental lighting conditions on 25 miners' ability to maintain "safe" upright balance while restricted to a 44-inch ceiling. Postural stability was quantified using a large force platform while performing simulated static tasks with different surface (dry, uneven, and slippery) and environmental lighting (poor and glare) conditions. During the testing workers performed the tasks in both a one-knee and two-knee posture. Parameters for characterizing postural stability included sway area (SA), sway length (SL), anterior/posterior (AP), and medial/lateral (ML) excursion. An increase in any of these parameters indicates an increase in postural instability. Postural instability was further evaluated using Index of Proximity to Stability Boundary (IPSB); a decrease in IPSB implies poorer balance/postural stability. Subjective ratings of perceived sense of sway (PSOS) and exertion (PE) during task performance was recorded. The tasks performed significantly increased the SA, SL, AP, and ML excursions (varying between 328% and 13,681%). The one-knee posture significantly increased the SA by 9% and the two-knee posture significantly increased the AP and ML excursions by 15% and 6%, respectively. Glare lighting conditions significantly increased the SL (by 4%). IPSB values were statistically significantly decreased (varying between 71% and 124%) for posture and task variables. The subjects' PSOS and PE were statistically significantly different for all variables of task, posture, surface, and lighting. Results from this study indicate that performing these simulated tasks may result in postural instability, especially when working on slippery surfaces and/or in glare light conditions.

9.

VALIDATION OF A COMPUTER-SIMULATION MODEL FOR HUMAN AMBULATION ON STILTS. C. Pan, K. Miller, S. Chiou, T. Kau, R. Current, NIOSH, Morgantown, WV.

The objective of this study is to validate a model to evaluate overexertion and potential fall-related injuries associated with the use of stilts. Under normal gait conditions, this computerized model could be used to evaluate stresses in various anatomical joints and simulate whole-body postural instability. Three construction workers between the ages of 34 and 40 with at least 12 months of experience in the use of stilts were recruited for walking tasks on 24-inch stilts. Twenty-eight reflective markers were placed on the subject's body and stilts. The model was validated using whole body center of mass and ground reaction forces. A PEAK™ motion system and two Kistler™ force platforms were used to collect data, producing an output file with time-synchronized records of both kinetic and kinematic measures. Inverse- and direct-dynamics simulations were performed using the model to generate center of mass and ground reaction force. For three coordinates (X, Y, Z) of the center of mass, the results of univariate analyses indicated very small variability (0.14 cm ± 0.11 cm, 5.4 cm ± 0.07 cm, 3.71 cm ± 0.03 cm) for the mean difference between the model and the actual measurement. The results of correlation analyses indicated similar trends for three coordinates ($r_x = 0.82$, $r_y = 0.88$, $r_z = 0.99$). Plotting the magnitude and vertical ground reaction force for both right and left feet showed small discrepancies, but the overall shape was identical between the model and the actual measurement. The percent difference between the model and the actual measurement for three coordinates of the center of mass, as well as magnitude and vertical ground reaction force, never exceeded 20%. Using this validated model, researchers will be able to examine whether stilt use increases the joint loadings and postural instability parameters while walking on stilts.

10.

IMPACT OF WORKPLACE RISK FACTORS ON POSTURAL STABILITY OF OLDER WORKERS. T. Sobeih, J. Gordon, A. Bhattacharya, P. Succop, University of Cincinnati, Cincinnati, OH; L. Kincl, University of Oregon, Eugene, OR.

The incidence of falls increases substantially in people above 65 years of age. As more older workers (OW) are returning to the workplace, there is a need to understand the impact of risk factors affecting their postural stability. The purpose of this study was to: 1) determine the changes in postural balance in OW while performing simulated tasks, and 2) determine the contribution of individual and combined risk factors (personal and work environment) on postural stability. Ninety-five subjects (age range 45 to 75) performed 3 tasks (stationary, sudden loading, and reach) while wearing two types of footwear, under two environmental lighting conditions, and standing on two types of surface slipperiness. Postural stability was quantified using a force platform and a human kinematics analysis system. Parameters for characterizing postural stability included sway

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