aihce

CO-SPONSORED BY AIHA® & ACGIH®

AIHce 2015

Abstract Book

May 30 – June 4, 2015

Salt Lake City, UT | Salt Palace Convention Center

www.AIHce2015.org

the job as management continued to investigate other suitable means for metal bridge deck demolition for future jobs.

Lessons Learned: Pre-construction planning for comprehensive management of metal fume exposures arising from bridge deck demolition is critical. If worn properly, PAPR's provide an effective means of airborne fume exposure control.

CS-401-07
Performance of Ergonomic Evaluation of Identified Plant Site Job Positions for Development of Specific Physical Demands Assessment and Revised Job Description Documentation

J. Koehn, L. McKelvey, W. Young, JK, Inc., Houston, TX

Situation/Problem: Professional and technical consulting services were requested by an industrial plant manufacturing Client to perform ergonomic evaluations for outlined job positions with specific physical demands including work task assessments at a facility located in Houston, Texas during 2013–2014. Review of prepared position descriptions and work activities was completed for a defined consulting scope of work to update documented and defined criteria subsequently used for job placement by nursing personnel working through Human Resources.

Resolution: A project team was assembled for defined plant site assessment of prioritized job work tasks and to prepare necessary documentation. The consulting team members included a Certified Industrial Hygienist (CIH), field/plant knowledgeable Industrial Hygienists, and a Certified Professional Ergonomist (CPE). Observations of physical and strenuous job tasks, noted work positions, and specific manual activities for operations, maintenance, and support groups were gathered for ergonomic quantification of risk levels for the Client. Process included extensive recordkeeping in addition to professional and technical evaluation, personnel interviews, administration of job position surveys, and work task investigation and documentation.

Results: Technical content of the outlined physical assessment categories related to health risk hazards and specific ergonomic work task evaluation was properly addressed through definition of two different conditions as "normal or representative" and also "worst case scenario". Specific job positions were investigated including recordkeeping through digital photographs and videos for accurate assessment and quantification of required physical demands. Updated job description documents for use by plant site nursing personnel related to new employee hiring procedures and position placement were finalized.

Lessons Learned: Industrial hygiene and plant operations knowledge was valuable for this project to facilitate plant site assessment and categorize risk levels for various job positions. Review of observed work task documentation provided specific quantification of noted repetitive activities with ergonomic risk assessment of required manual and strenuous components. This information was further employed by plant Human Resources personnel to outline elements of pre-employment physical assessment procedures for job position evaluations.

SR-401-08
Field Study of High Flow Rate Respirable Size Selective Samplers for Silica Measurement

T. Lee, M. Harper, M. Kashon, NIOSH, Morgantown, WV

Objective: To determine the feasibility of utilizing the high flow rate samplers (CIP10-R, FSP10 and GK2.69) in measurements of respirable crystalline silica collected from various occupational environments by comparison with low flow rate samplers (10-mm nylon cyclone and Higgins-Dewell type cyclone).

Methods: Samples were collected in seven occupational sites in the US, including construction (masonry and demolition), silica sand production, metal mine and labor union training centers, and five stonemasonry sites in Ireland. Side-by-side personal sampling was conducted with 6 combinations of high and low flow rate samplers. When personal sampling was unavailable, a stationary Lippman-type sampling apparatus was utilized and placed near the working area. Gravimetric analysis was used to determine respirable dust mass concentration and X-ray diffraction analysis was used to determine quartz mass concentration.

Results: Eleven sets of area samples and 268 pairs of personal samples were obtained. Due to large variation in field condition, the respirable dust mass and quartz mass concentrations ratios <0.3 and >3.0 between the high and low flow rate samplers were considered as outliers. The frequency of samples above the limit of detection of quartz (5μg) was significantly ($p<0.05$) higher when the CIP10-R and FSP10 samplers were used compared to low flow rate samplers while the GK2.69 cyclone did not show significant difference from low flow rate samplers. The same result was produced in the frequency of above limit of quantification (15 μg) between high and low flow rates samplers. Some pairs of the samplers showed significant differences ($p<0.05$) in respirable dust mass concentration and quartz mass concentration but these differences disappeared when outliers were removed. Some pairs of the samplers showed a significant difference from a 1:1 relationship in accordance with linear regression analysis when outliers were removed. However, while the differences were significant, they are not large.

Conclusions: The high flow rate samplers did not generally show significant differences in respirable dust mass and quartz mass concentration. The high flow rate samplers also provide more dust for subsequent sample analysis, allowing for better precision. However, higher flow-rate samplers may have other attributes that could influence the decision as to whether they should be used for personal sampling.

SR-401-09
Measuring Workers' Exposure to Metals in Smelter Materials Used as Fill and Assessing Potential Risk

L. Beyer, M. Seeley, G. Greenberg, B. Beck, Gradient, Cambridge, MA;; S. Thakali, URS Corporation, Philadelphia, PA; F. Melnikov, Yale University, New Haven, CT

Objective: Smelter material (brick, smelter residue, retort), has been used for road construction in the US. When workers handle these materials while repairing roads and bridges, metals could be transferred to hands and subsequently ingested, resulting in a potential health risk. We conducted a hand transfer study to simulate potential exposure. Our objectives were to measure the amount of metals workers might get on their hands as a result of contacting the smelter material used as fill, estimate intake by workers potentially contacting the materials, and assess risk.

Methods: We evaluated exposure to metals from direct contact with smelter material following a study procedure based on peer-reviewed methodology. Smelter material was collected alongside roads and bridges and shipped to a laboratory where, according to a detailed protocol, volunteers handled the material in a manner simulating how workers would contact the material. The volunteers' hands were then rinsed, and the rinsate was analyzed for lead, zinc, arsenic, and cadmium.