Due to the frequency and quantity of isoflurane used in our facility, it became essential to identify and present any changes that could be recommended to the group and implemented into the process, which would aid in minimizing the employee's exposure.

This presentation focuses on samples taken, methods, individual and task-related isoflurane results (including averages), lessons learned, and looking ahead.

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LEAD AND NOISE EXPOSURES DURING OPEN ABRASIVE BLASTING ON TWO STEEL BRIDGES. C. Kirkham, S. McAllister, Cal/OSHA, San Francisco, CA.

Bridge retrofit work has increased in the last decade. The literature fails to provide sufficient characterization of the seemingly high noise and lead exposures during bridge open abrasive blasting. Blasters on some retrofits are experiencing medical-removal blood lead levels, and hearing loss is often not monitored. PPE is commonly relied upon rather than engineering and administrative controls. Two painting contractors open abrasive blasted on 1940's-era bridges and were evaluated for noise exposures, lead exposures, and the sufficiency of commonly used blasting PPE. Spot paint removal to "Near White Blast SP10" was conducted using copper slag grit in large negatively-pressurized containments accommodating one to three blasters. Blasters used supplied-air continuous-flow rubberized canvas hood respirators, with an assumed protection factor of 1000, and foam earplugs with NRRs of approximately 30 dB. Calibrated noise dosimeters and 3-mm MCE cassette/pumps were placed outside of all PPE, except during two noise evaluations. All outside-hood 8-h TWA noise exposures were above 100 dBA, and half were between 109 and 115 dBA. Two under-hood 8-h TWAs were 102 and 108 dBA. Using an estimation of workplace attenuation ((NRR–7 dB)/2), earplugs failed to reduce 8-h TWA exposures to less than 90 dBA. Average lead contents of blasted paint samples from bridges #1 and #2 were 29% (3–44%, n = 11) and 22% (10–29%, n = 5) respectively. Of 51 blasting cassettes, 12 were greater than one half the IDLH level of 100,000 ug lead/m^3, and five were at or above IDLH. Respirators were not approved for IDLH. The geometric mean of 8-h TWA lead exposures on bridge #1 was 23,371 ug/m^3 (9881–56,781 ug/m^3, n = 9), and on bridge #2 was 5569 ug/m^3 (2197–38,579 ug/m^3, n = 7). One of the 16 blaster's 8-h TWAs exceeded the protective capability of his respirator (50,000 ug/m^3) and four exceeded half of that value.

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WORKER EXPOSURES TO OZONE AND OTHER CONTAMINANTS DURING TIG AND MIG WELDING. G. Burr, R. Sollberger, C. Achutan, NIOSH, Cincinnati, OH.

NIOSH evaluations were conducted at a company producing oil coolers used in the U.S. Army main battle tank. Workers described health effects during tungsten inert gas (TIG) and metal inert gas (MIG) welding on aluminum oil coolers, including burning eyes, sore throats, headaches, sinus problems, and exhaustion. Employees were also concerned about discoloration on their welding visors. Air sampling was performed for ozone, metals (specifically aluminum), trichloroethylene (TCE, used in a nearby degreaser), and phosgene (a possible combustion product when chlorinated hydrocarbon comes in contact with a flame or very hot metal). During the initial survey the highest exposures were to ozone, ranging up to 0.7 parts per million (ppm) for short-term (five minute) exposures, exceeding the NIOSH ceiling limit for ozone of 0.1 ppm. Higher concentrations were measured during MIG welding (up to 0.7 ppm) compared to TIG welding (< 0.05 to 0.1 ppm). Exposures to other contaminants were well below occupational exposure limits (OELs). A brownish-red residue that accumulated on the welding visors contained iron and copper. During the follow-up survey, full-shift ozone concentrations ranged from not detected to 0.08 ppm, while short-term (five minute) concentrations were not detectable. However, no MIG welding was performed during the follow-up survey. Detector tube samples for TCE revealed short-term concentrations ranging from 5 and 100 ppm in the vicinity of the degreaser. All other contaminant levels were below their OELs. Phosgene was not detected during either survey.
Recommendations to reduce ozone exposures included installing engineering controls (more local exhaust ventilation, larger exhaust hoods, and more general room ventilation), limiting the amount of welding during a workday, and using respiratory protection while implementing these engineering or administrative controls. For the degreaser operation recommendations included performing full-shift sampling for TCE and providing additional operator training and personal protective equipment.

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EXPOSURE TO METAL FUMES DURING SCRAP METAL RECYCLING. M. Rodriguez, CDC/NIOSH, Cincinnati, OH.

The National Institute for Occupational Safety and Health (NIOSH) received a health hazard evaluation request from a large scrap metal recycling company to evaluate whether their employees were overexposed to lead and other metals and if they needed to comply with the OSHA Lead standard, 29 CFR 1910.1025. Lead and other hazardous metals were suspected in the base metal, alloys, and preservative coatings on the recycled scrap. Contamination of clothing and hands was also a concern since these conditions may create an ingestion hazard and may contaminate the worker's car, home, and family. The two job categories evaluated were Burners, cutting large pieces of scrap metal usually several inches thick with an oxygen/propane torch, and Plate Cutters, cutting steel plates less than one inch thick with the same type of torch. NIOSH investigators collected 27 personal air samples for elements over three consecutive workdays, 13 on the Burners and 14 on the Plate Cutters. Of the 13 samples collected on the Burners, 12 were over the OSHA permissible exposure limit (PEL) or action level (AL) for lead. Several Burners exceeded the OSHA PEL for cadmium, copper, and arsenic. In addition, three Burners exceeded the NIOSH recommended exposure limit for nickel. One Plate Cutter exceeded the OSHA PEL for lead and four, the AL. Wipe samples were collected from employees' hands, personal protective equipment (PPE), and work surfaces and analyzed for lead and other metals. Lead was found on the workers' hands, PPE, and other surfaces in concentrations ranging from none detected to 760 µg per sample. The employer was informed of the requirements in OSHA's substance-specific standards, specifically the need for engineering controls, use of showers, maintaining clean work surfaces, and use of respiratory protection until engineering controls are implemented.

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EVALUATION OF WORKER EXPOSURES DURING THE MANUFACTURING OF HIGH QUALITY CORROSIVE RESISTANT STAINLESS STEEL PRODUCTS AND FABRICATED PIPING SYSTEMS. R. Hall, D. Rhodes, E. Page, CDC/NIOSH, Cincinnati, OH.

NIOSH conducted a health hazard evaluation of worker exposures during the welding and manufacturing of stainless steel products and fabricated piping systems. Worker representatives expressed concerns about potential carcinogenic effects from exposure to nickel and chromium. Personal breathing zone air sampling was conducted during cutting, welding, and grinding for elements (including nickel and chromium), total welding fumes, hexavalent chromium, ozone, nitrogen dioxide, and carbon monoxide. Samples indicated the potential for some workers to be exposed to nickel and hexavalent chromium concentrations above the NIOSH REL, and to manganese above the ACGIH® TLV®. PBZ results indicated the highest concentrations for nickel, manganese, and hexavalent chromium occurred during welding operations inside large stainless steel pipes or while welding fins on a large stainless steel pipe. Ozone results indicated concentrations exceeded the NIOSH REL ceiling limit, and indicate the potential to exceed ACGIH and OSHA criteria (if consistent welding is accomplished throughout the work shift) during welding operations inside pipes. Although the potential for exposure to Ni and Cr exists, at the time of our evaluation the types of cancers linked to these substances have not been reported among current or former employees. Recommendations were provided to help reduce exposures.

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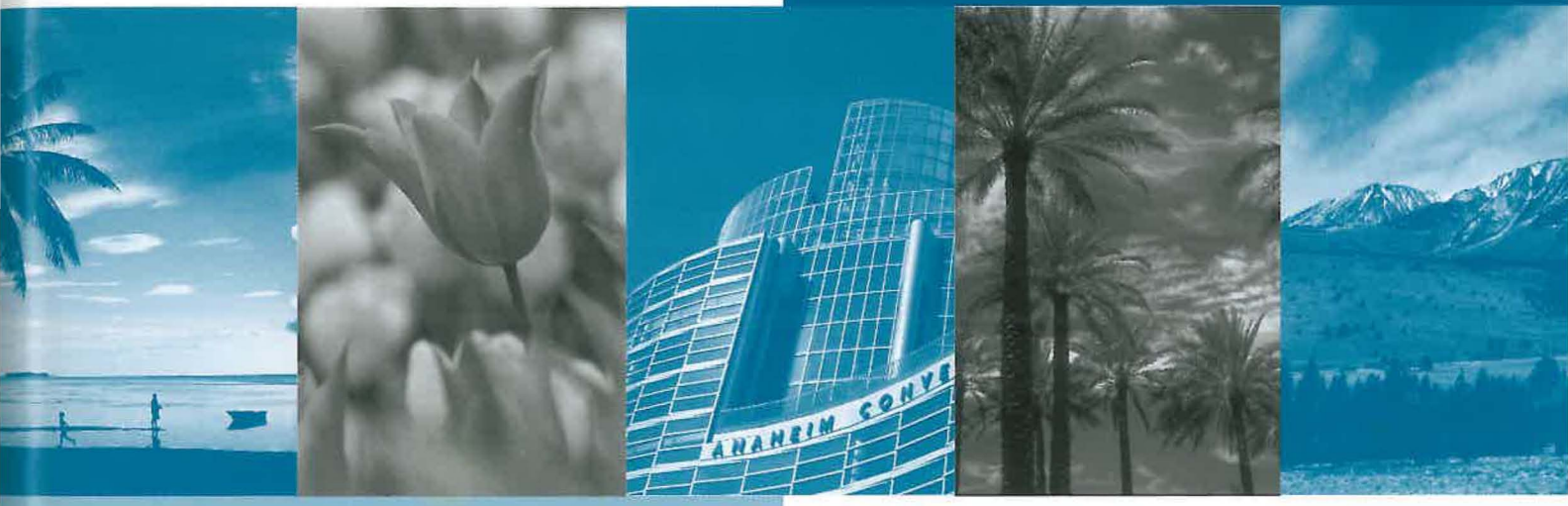

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