Occupational Health Watch

Preventing California Worker Injuries & Illnesses

Changes at OHB

Some changes are underway at the Occupational Health Branch (OHB) in the California Department of Health Services (CDHS). First, we are creating a new e-newsletter so that we can make our updates to you more timely and frequent. Please send a note to us at OHW@dhs.ca.gov to receive our e-newsletter. This will be the last issue of Occupational Health Watch in this format.

Second, OHB has reorganized its Web site to make it more attractive and easier to use. Our new Home Page gives an overview of our mission and links to a page where you can see all our major programs and activities at a glance. "What's New" boxes highlight upcoming events, new OHB initiatives, and newly available materials. We have also added "Resources Pages" specifically for workers, employers, and health care providers. Log on to www.dhs.ca.gov/ohb and take a look.

Finally, on July 1, 2007, OHB will become part of the new California Department of Public Health. We are excited to see this increased emphasis on public health and prevention statewide.

In this issue

Ergonomic Hazards in Waste Handling

OHB recently completed a project to identify hazards and protect workers at plants that process medical wastes. Medical wastes include sharp needles, lab samples, live vaccines, and human body fluids and waste. Exposure to these infectious wastes may cause hepatitis, AIDS, and other diseases.

Concern about hazardous emissions from medical waste incinerators has resulted in a shift from incineration to alternative methods with lower environmental impacts. Now, most California hospitals send their waste to offsite facilities where it is sterilized with steam in large pressurized autoclaves.

Worker lifts waste onto conveyer.

A coalition of environmental and health care worker organizations, Health Care Without Harm, asked OHB to examine hazards facing workers at plants using steam sterilization technology. They wanted to ensure that an environmental improvement had not created new hazards for workers. OHB conducted an in-depth investigation at one large treatment plant to assess hazards and current efforts to protect workers, evaluating all steps in the work process. These include waste generation, transport, sterilization, and final disposal at the landfill.

We found that workers at this plant had a very high rate of injury, as much as five times higher than average for California waste treatment and disposal workers. Workers' most significant exposures were not unique to steam autoclave technology, but were a predictable consequence of a work process involving extensive manual handling of waste. Almost 60% of injuries were due to lifting, pushing, pulling, or otherwise moving tubs of waste. Other hazards noted were exposure to chemicals, infectious agents, and radioactive materials, as well as noise, heat, and sharp needles.

OHB made recommendations to medical waste generators and treatment facility operators. Waste generators such as hospitals could reduce hazards by producing less medical waste for disposal. They should also improve their practices for screening, segregating, packaging, and labeling wastes. Plant operators should redesign the work process to reduce manual handling of waste, improve housekeeping procedures, and train workers.
For the full report: *www.dhs.ca.gov/ohb/OHSEP/medicalwaste.pdf*

Butter Flavor Chemical Harms Workers

In 2004, OHB learned that a 29-year-old worker in a food flavoring plant had a serious, life-threatening lung disease called bronchiolitis obliterans (BO). Although he was young, had never smoked, and had not previously worked with chemicals, he developed breathing problems and other symptoms at his job. His illness progressed quickly; soon he could no longer work and was eventually put on a waiting list for a lung transplant.

BO was first associated with butter flavoring when workers in the midwestern U.S. became sick while making and packaging microwave popcorn. Scientists and doctors at the National Institute for Occupational Safety and Health (NIOSH) investigated and concluded that exposure to diacetyl, a chemical contained in butter flavoring, was a likely cause of the disease. Other chemicals in the mixture may also cause lung damage.

Making powder flavorings with diacetyl caused lung disease in workers.

Although the number of known BO cases in California has been small, OHB was concerned that this rare disease may not be recognized and connected with making food flavorings. Other workers could be getting exposed to diacetyl that may result in lung disease.

Warning about diacetyl hazards

In May 2006, after a second BO case was found in California, OHB launched an outreach campaign to alert employers, health care providers, and workers about the hazard of diacetyl in flavorings. We developed a Health Hazard Alert on diacetyl in English and Spanish that described the link to BO and addressed what employers should do to protect workers. A key step to preventing lung disease, or detecting it early, is for employers to have a worksite medical program that includes periodic lung function testing for employees and interviews about their health.

Since there is no known safe level of exposure to diacetyl, OHB advised employers to utilize several control measures: install ventilation systems that collect diacetyl vapors or dust where they might escape, have employees wear respirators with organic vapor and particulate filters, and consider using safer alternatives to diacetyl. These controls will also help to protect workers from other harmful chemicals handled in flavor manufacturing.

OHB's outreach was aimed to alert other organizations that could help spread the word about this newly recognized hazard in California. Examples of our partners include health professional organizations like the California Thoracic Society, whose members specialize in lung disease, and worker-focused groups like Worksafe! and the Working Immigrant Safety and Health Coalition. These groups included warnings about diacetyl on their Web sites and sent out notices to their members.

OHB's timely outreach and worker education effort has served as a model for other states on how to respond to BO or other new occupational diseases.

Statewide focus on flavor manufacturers

OHB and the California Division of Occupational Safety and Health (Cal/OSHA) agreed to work together on a statewide effort to ensure that all California flavoring companies are taking the steps needed to protect their workers. The two companies where BO cases were identified have been inspected by Cal/OSHA, cited for violations, and ordered to make necessary improvements.

The remaining 26 companies agreed to participate voluntarily with Cal/OSHA Consultation Service and OHB, rather than be subject to a compliance inspection. These companies must conduct routine medical monitoring, including lung function tests for employees. Diacetyl exposures must be measured by either an industrial hygiene consultant or Cal/OSHA Consultation Service. An effective respirator program must be in place, and additional controls such as local exhaust ventilation implemented based on industrial hygiene recommendations provided to the company.

OHB is reviewing the medical testing data to ensure that tests are being done properly and to assess the risk factors for lung disease in this industry. We are also working with Cal/OSHA to draw conclusions based on all of the information obtained about these companies. This effort will result in a summary report that provides clear recommendations on what is needed to prevent this serious, work-related lung disease.

For more information, including OHB's outreach materials: *www.dhs.ca.gov/ohb/flavorings.htm*

Asthma Risk in Making Heart Valves

OHB began its program to track and prevent work-related asthma (WRA) in 1993. The program monitors new cases of asthma in workers, as well as pre-existing asthma made worse by conditions at work. Certain chemicals are of special interest for asthma prevention, as they have been shown to be sensitizers. Sensitizers can cause new asthma in people who have never had asthma before.

There are over 350 substances found in the workplace identified as being capable of causing new WRA cases. One of these sensitizing chemicals is glutaraldehyde, which is used in a variety of industries and occupations.

Uses for Glutaraldehyde
Disinfectant/sterilant
Embalming fluid
Tissue fixative
Leather tanning
X-ray film processing
Dental material preparation
Production of resins or dyes

In 2003, OHB learned that large amounts of glutaraldehyde were used to manufacture heart valves made of animal tissue and that two large manufacturing plants were operating in California. Our tracking system had also identified asthma in a heart valve manufacturing worker. At the time, Cal/OSHA was considering setting lower workplace exposure limits for glutaraldehyde to protect California workers. Therefore, OHB staff wanted to determine how heart valve workers were exposed to glutaraldehyde and whether workplace protections were adequate.

We reviewed the scientific literature and visited two companies to evaluate worker exposure. The site visits included observing the manufacturing process, interviewing employees and representatives, and reviewing plant safety records.

What we learned

About 600 mostly female workers in the two companies have constant exposure to glutaraldehyde in the air, and may also have skin or eye contact. The workers cut, sew, and package heart valves made of animal tissue that has been soaked in glutaraldehyde solutions. Glutaraldehyde helps sterilize and fix the tissue.

Over four years, a total of 13 cases of glutaraldehyde related illness were recorded at the two companies. This included two cases of asthma, as well as cases of dermatitis, rhinitis, and other symptoms.

These cases were reported to the company by the employees' health care provider. The levels of glutaraldehyde in the air measured by the two companies were all well below the current Cal/OSHA Permissible Exposure Limit (PEL) of 0.2 parts per million (ppm) ceiling. Cal/OSHA has set a new PEL of 0.05 ppm-ceiling, effective July 2008. The lower level may not be low enough to protect workers from developing asthma, so OHB recommends keeping exposure lower - below 0.015 ppm. Repeated exposure to glutaraldehyde, even very small amounts, can cause asthma, making it impossible for workers to continue working where glutaraldehyde is used.

What we recommend

Both companies had put some controls in place to try to protect workers from glutaraldehyde exposure, but more work was needed.

To reduce the risk of health effects including WRA, heart valve manufacturers should:

- Use engineering controls (closed systems and special ventilation) to minimize workers' exposures, to at least below a level of 0.015 ppm, while continuing efforts to find safer chemical substitutes for glutaraldehyde.
- Include workers in the process to select engineering controls and monitor exposures after changes are made.
- Provide appropriate gloves to prevent skin exposure. Latex gloves should not be used.
- Require the use of safety glasses when handling glutaraldehyde solutions.
- Implement a medical surveillance program for glutaraldehyde-exposed workers for early diagnosis of asthma.
- Train workers about symptoms and health effects of glutaraldehyde exposure, including WRA.
- Set up a joint worker-management health and safety committee.

For an executive summary of the report: *www.dhs.ca.gov/ohb/OHSEP/glutaraldehyde.pdf*

Silicosis: Who is at Risk in California?

The hazards of silica dust have been known for centuries. Silica has been linked to lung disease among quarry workers in ancient Greece, stone cutters in the 16th century, and sand blasters and foundry workers around the time of World War I. Given this history, why are 1.7 million workers still exposed to silica in the United States? And, what can be done to protect them?

Several years ago, OHB received funding from NIOSH to start a new project to answer these questions. The purpose was to determine how California workers with silicosis were exposed to silica and to develop recommendations to prevent future disease.

Silica health effects

Silicosis is the most common disease caused by breathing in silica dust. The dust can cause scar tissue to form in the lungs, making it increasingly harder to breathe. With no known cure, it can eventually be fatal. At least 2,000 people die from work-related silicosis each year in the U.S.

Silica dust is also associated with increased risk of lung cancer, tuberculosis, chronic obstructive pulmonary disease (COPD), chronic renal disease, rheumatoid arthritis, and scleroderma. Silicosis often receives the most attention because there is a clear connection between the disease and exposure to silica dust, while the other diseases may also be caused by other factors. However, there are still many challenges to identifying new silicosis cases.

Tracking silicosis in California

OHB began tracking workers with silicosis by looking at several existing reporting systems, including death records, hospital discharge data, and workers' compensation records. Looking at multiple sources helped researchers identify as many cases as possible. It also gave us a better understanding of the reporting accuracy of each source. For example, workers' compensation data alone give an incomplete picture because many workers develop symptoms of silicosis after they retire and do not file for compensation.

In addition, each year we wrote to all hospitals and pulmonary doctors in the state, asking them to report new cases of silicosis. A total of 238 cases were identified during the three-year period 2000-2002, or about 80 cases per year. Eighty percent of these workers were found due to the letters OHB sent, and would have been missed if only the existing data records were checked.

The next step was to get more information on each of the 238 persons identified. Each person was interviewed to confirm whether they were exposed to silica on the job, and to identify the job and the industry in which they worked. The next-of-kin was interviewed when the person had died (nearly half of the cases).

Worker medical records were reviewed by experts to make sure the silicosis diagnosis was correct. Chest x-rays were reviewed by NIOSH-certified "B readers," physicians who are specially trained to read x-rays for silicosis, asbestosis, and other dust-related lung diseases.

What we found

About two-thirds (68%) of the 238 reported silicosis cases met the criteria for confirmed or probable work-related silicosis. Only two percent of the cases were found to have had environmental exposure. There was not enough information on 17% of the cases to confirm the diagnosis of silicosis, and 18% were found not to be silicosis. The jobs with the highest number of confirmed silicosis cases are shown in the table.

238 Workers with Silicosis, California, 2000-2002, by Occupation

Mining Machine Operators	15 %
Construction Laborers	7 %
Non Construction Laborers	6 %
Brickmason/Stonemasons	4 %
Industrial Machine Repairers	3 %
Plumbers, Pipefitters, Steamfitters	3 %
Explosive Workers	3 %
Welders and Cutters	3 %
Operating Engineers	3%

A group of related occupations in the mining industry together account for 25% of all silicosis cases. These jobs include mining machine operators, operating engineers, crushing and grinding operators, and mining supervisors and engineers. The most common type of mining in California is sand and gravel. Based on interviews with the silicosis patients, lifetime silica exposure was estimated to be highest among industrial sand and gold mining operations.

Many construction industry jobs also expose workers to silica. About one-quarter of workers with silicosis had done sandblasting.

Hidden costs of silicosis

Silicosis severely impacts the quality of life of victims before their premature death. Shortness of breath was reported by 85% of the people interviewed. Seventy percent needed to walk slowly due to breathlessness, and almost half were too breathless to leave their house or manage the activities of daily living such as dressing. About two-thirds had been hospitalized for their breathing problems.

In spite of clear evidence linking silica exposure with silicosis, almost three-quarters of the silicosis patients in California did not file a workers' compensation claim. One factor may be that the average age when silicosis was diagnosed was 72. These retired workers may not have realized they were still eligible for workers' compensation.

Of 19 confirmed cases who did file claims, seven received compensation, four were denied, and seven were pending. Given that the average silicosis patient was hospitalized more than five times due to breathing problems, the general health care system, rather than workers' compensation, likely carries much of the economic burden for work-related silicosis costs.

Shoveling gravel creates a silica dust hazard.

Reducing silica dust in sand and gravel

The sand and gravel industry was targeted as an industry with potential overexposure to silica dust, based on what we learned from our tracking data. Over 10,000 workers in California are employed in 362 sand and gravel operations. Sand and gravel operations are considered surface mining, and are regulated by the Federal Mine Safety and Health Administration (MSHA). OHB consulted with MSHA to identify worksites for investigation.

One investigation looked at exposure at an open-pit quarry. Stone was mined and then crushed, bagged, and loaded onto trucks and barges for delivery. OHB's goal was to measure current worker exposures to silica and recommend how to reduce exposure.

OHB experts surveyed the facility, selected the jobs most likely to have high exposures, and measured silica dust levels in the workers' breathing zone over a work shift. We found that workers were exposed to more than two times the permissible limit when operating the rock crusher, loading the crushed product, and performing maintenance and grounds-keeping activities. A laborer at one of the crushing plants was exposed to five times the permissible exposure limit. OHB recommended a number of control measures and work practices that the employer should implement.

How to Reduce Silica Exposure

These recommendations to employers and workers are based on OHB's investigation of the sand and gravel industry, but they may also apply to other jobs and industries with silica or dust exposure.

Control dust exposure at the source

Instead of dry sweeping or using compressed air to clean up:

- Use local exhaust ventilation to capture dust where generated, or
- Use water to keep dust levels down.

Use safe clean-up methods

- Provide water for workers to wash their hands before eating.
- Use a HEPA (special high-efficiency) vacuum when possible.

Avoid take-home exposure

- Provide lockers so that dirty work clothes and shoes are stored separate from clean ones.
- Provide for laundering onsite or by an industrial laundry service.

Use respirators for short-term dusty jobs

This includes dry sweeping, shoveling fine dry material, blowing out an air-bagger, or filling sacks.

- First, try to use work methods that reduce dust.
- Wear half-mask respirators with P-100 filters (not paper) while doing dusty jobs.
- Employers must make sure that a full respirator program is in place, including medical clearance, fit testing, and training.

Monitor the air to check if controls are working

- All work areas and work shifts.

Provide worker training

- Train all employees each year on the hazards of silica dust exposure and how to prevent it, as part of the required Injury and Illness Prevention Program (IIPP).
- Clearly communicate required and prohibited work practices and when respirators must be worn.

Conduct medical screening for silicosis

- Provide medical monitoring for silica-exposed workers.
- Include chest x-rays, reviewed by experts.
- Follow medical guidelines at *www.oem.msu.edu/Resources/SilicaScrnProtocol_2003_pdf*

Linking Students to Worker Safety Careers

Many current professionals first learned about the field of worker health and safety through internships and field placement programs set up after the creation of OSHA and NIOSH over 35 years ago. Young medical, nursing, and public health students worked on projects out on the shop floor, interacting directly with workers. Many interns were excited to find a career that allowed them to combine their clinical and technical skills with a public health focus on prevention rather than after-the-fact treatment. These professionals went on to create university occupational health research programs, start new medical clinics, work for government agencies, train workers and employers, or work in the private sector.

Fast forward to 2007, when many of these professionals are approaching retirement age, and the need to recruit students to careers in occupational health becomes critical. Add to the mix a vastly changed workforce in California with many more immigrant and minority workers employed in low-wage, service sector jobs. Hiring more occupational health professionals is not going to be enough. Recruitment efforts must also target students with the language and cultural skills to effectively reach this new workforce.

OHB has been working to fill this gap through its support of the Occupational Health Internship Program (OHIP). For an eight-week commitment over the past three summers, OHIP has placed undergraduate and graduate students with unions, community groups, and joint labor-management training programs. OHB staff have helped supervise the students on projects in the San Francisco Bay Area and Los Angeles. OHIP is a national program supported by NIOSH, the California Wellness Foundation, the Centers for Occupational and Environmental Health (COEH), and others.

Since OHIP began in 2003, 25 students have participated in California, 17 based at OHB and 8 at the University of California, Los Angeles (UCLA) Labor Occupational Safety and Health Program (LOSH). The Labor Occupational Health Program at UC Berkeley has worked with OHB to coordinate some of the Bay Area projects. While most of the students come from California university campuses, we have also hosted public health graduate students from Seattle and Philadelphia, and a first-year medical student from Connecticut.

Many of these students come from immigrant backgrounds and bring language skills that have been critical to the success of the project. Interns spoke two Chinese dialects to interact with workers in garment shops and Chinatown restaurants, and Spanish to reach non-English speaking janitors, hotel room cleaners, day laborers, and farmworkers.

OHB benefits greatly from this program, learning about worksite hazards or issues in a timely manner. For example, students working on heat illness among farm workers last summer learned that many recent immigrants from southern Mexico speak Mixteco, a broad term that describes several related native dialects. Some farm regions also have a new influx of workers from the Punjab region of India. As a result, future OHB health and safety materials for farmworkers should include a strategy to effectively communicate with these newly arrived immigrants.

Interns train Los Angeles garment workers.

OHIP is designed to give students a learning experience based on understanding the world of work from the workers' point of view. Thus, they are required to develop a final product that workers in the sponsoring organization can use to improve their work environment.

For example, students working with farmworkers and California Rural Legal Assistance addressed the issue of low literacy by crafting a short audio script on heat illness prevention. It was translated into Spanish and Mixteco, and distributed to workers on a CD, their preferred format. Students working with sewing machine operators on ergonomic hazards designed a brochure showing a model work station and work practices to reduce the risk of injury; it was translated into Spanish and Chinese. (See related story on page 7.)

Has OHIP succeeded in created a pipeline for new occupational health professionals? So far, three interns have been hired by occupational health or labor programs and two have joined CDHS in the Environmental Health Tracking Program. Many interns are still in school, but are bringing their OHIP experience into the classroom. For example, a first-year medical student has given presentations on immigrant health and safety issues to the Latino Medical Students Association, based on what he learned about day laborers over the summer in Los Angeles. OHB is proud to support this program and work with the student interns to ensure the safety of all workers, now and in the future.

For more information: *www.aoec.org/OHIP*

Simple Solutions for Garment Worker Pain

Garment workers have long been known to suffer from pain and injuries to their arms, neck, and back due to poor work station design. OHB joined researchers from UCLA and UC San Francisco in a recent study to find out if simple changes in garment shops can decrease work-related musculoskeletal pain in sewing machine operators. The study involved 560 workers at 13 garment shops in the Los Angeles area, and is the largest study of this type to date. The study found that simple changes in work station design can reduce pain in garment workers.

The main finding of the study was that garment workers who used an ergonomic chair reported a decrease in pain in the neck, shoulders, arms, legs, hips, and back. The chair was specially designed for garment workers, with adjustable height and a sloping front edge to make it easier to lean forward. Garment workers were fitted for the right-sized seat pan and taught how to adjust their chair. Employers could keep the chairs after the study as an incentive for some shop owners to participate.

Other factors that were shown to decrease musculoskeletal pain among the garment workers included:

- taking more than 35 minutes total of rest breaks throughout the work day;
- rotating between sewing and other tasks or rotating between machines; and
- reducing the most physically demanding work tasks.

Other recommendations included good task lighting with fluorescent or low-heat bulbs, cooling fans, eye exams and eyeglasses for near work, foot rests to provide balance and stability, and low tables to reduce reaching and twisting.

Once completed, the next challenge was to explain the study results to all workers and their employers. The key message stressed continuing to use the chairs and following the recommended work practices to reduce pain.

Since most of the garment workers spoke either Spanish or Chinese, summer interns fluent in these languages helped develop educational materials and conduct worksite trainings. Over 600 workers at seven garment shops were trained in small workshops, attended by study participants as well as current workers who were not part of the study (see photo, page 6). The interns were part of OHIP, and worked under the guidance of the UCLA LOSH Program. This project illustrates how researchers and students can combine their expertise to most effectively inform workers about the results of workplace studies.

Investigating a worker and baby's high lead levels

What happened?

A 37-year-old man was hired at a facility that manufactures specialty radiators. He was assigned to one of the jobs identified as having no lead exposure. After six weeks on the job, the worker had his blood lead level (BLL) tested as part of his employer's routine lead medical surveillance program. The employer was shocked to learn that the new worker had a BLL of 42 µg/dL, much higher than the U.S. adult average of less than 2 µg/dL. To make matters much worse, the worker's two-month-old baby was tested and also found to be lead poisoned.

The elevated BLLs of the baby and employee led to investigations by the local county health department and OHB's Occupational Lead Poisoning Prevention Program (OLPPP).

The county health department's investigation included a visit to the worker's home to look for potential sources of lead exposure. Nothing was found on the home investigation to explain the baby's high BLL.

OHB staff interviewed both the worker and the employer about specific job tasks to help determine how the worker was exposed to lead. His job involved cutting, grinding, and trimming stamped metal parts used to fabricate radiators. These tasks created a lot of dust. Nickel Terne Coated Steel Sheeting (Terne) was used in this process.

The worker was wearing his own clothing and shoes to work because the company has a waiting period before supplying new hires with work clothes. As a precaution, after learning of the employee's elevated BLL, the employer placed the worker in a different job.

OHB staff reviewed a copy of the Material Safety Data Sheet (MSDS) for the Terne, which showed the metal did contain lead. This explained the reason for the two cases of lead poisoning, with the baby exposed to lead brought home on the father's clothing.

What was learned?

- Employers must check new MSDSs carefully when received from suppliers or manufacturers. In this case, the employer missed the fact that lead was a component in the sheet metal product because the company did not have a good system to review new MSDSs.
- BLL testing is important. A plant-wide BLL testing program identified high lead exposure in an employee believed to be in a lead-free job.

Lessons for Lead Safety in Bridge Work

After the devastating 1989 Loma Prieta earthquake, in which a portion of the San Francisco/Oakland Bay Bridge (Bay Bridge) failed, the California Department of Transportation (Caltrans) evaluated the seismic safety of the state's largest bridges. As a result, the west span (San Francisco side) of the Bay Bridge was slated for seismic retrofit work, and the east span for demolition. On the Carquinez Bridge, the 1956 span needed seismic work while the 1927 span needed to be demolished and replaced.

A review of the recent construction work on Bay Area bridges by OLPPP staff revealed some underlying factors that can influence the level of worker safety on large public works projects. OLPPP was involved as part of its ongoing efforts to promote the use of recognized lead control measures.

Lead hazards on bridges

Seismic retrofit work and demolition of old, lead-painted bridges can disturb existing lead paint and put construction workers at risk for lead poisoning. While the work done on each bridge span was site specific, all projects involved varying amounts of abrasive blasting and torch cutting of lead paint coated steel beams, bolts, and rivets. This work can generate dangerously high levels of lead in the air and on work surfaces. Lead is known to cause serious health effects including nerve damage and high blood pressure.

Each bridge job has had its particular challenges for health and safety. On some projects, painters, iron workers, or laborers became severely lead poisoned with blood lead levels (BLL) of 50 micrograms of lead per deciliter of blood (µg/dL) or greater. Significant numbers of bridge workers had BLLs from 25 to 49 µg/dL. Long-term BLLs 10 µg/dL or higher put workers at risk of adverse health effects.

Bid process should address safety

What determines how safe these multi-million dollar jobs are and whether workers die, get hurt, or are lead poisoned? OHB's experience tells us that successful safety programs exist where there is both a strong commitment from top management and early implementation of health and safety measures. Management commitment is reflected in whether contractors include the necessary costs to address health and safety in their bid package. A bid that is much lower than other bidders' will often undercut health and safety. On one bridge retrofit project where the chosen contractor grossly underbid four other contractors by $58 million or more, the job had many health and safety problems. Under current state requirements, Caltrans must award the contract to the lowest bidder. There are currently no pre-bid qualifications that factor in each bidder's heath and safety track record.

A safety culture is key

OLPPP has worked with bridge contractors to address lead safety both proactively, before the start of a project, and after workers have been found to be lead poisoned. We encountered very different approaches to safety on the recent bridge projects, which were reflected in worker BLLs on the job. In general, when OLPPP works with the contractors at the start of a job to implement good safety practices, the contractors tend to be more cooperative, and worker BLLs are likely to remain lower than when OLPPP intervenes later.

Torch cutting while wearing Powered Air Purifying Respirators (PAPR) and fall protection.

For example, on one bridge project where a significantly large number of workers had high BLLs, the contractor was resistant to following recommendations from OLPPP and Cal/OSHA to address problems of inadequate hand washing facilities, lack of engineering controls, and improper selection of respirators. Instead, there was a tendency to do the minimum and then to blame the workers for the problems. This approach can result in poor employee morale and high turnover, making a safe work environment even harder to achieve.

In contrast, the contractor on another bridge project took a proactive approach to health and safety, and has not had a worker lead poisoning problem. Following OLPPP's early recommendations, they used personal air monitoring results to select appropriate respirators and provided Powered Air Purifying Respirators (PAPRs). They also provided a decontamination trailer at the staging area, wash-up facilities in the different work zones, and a dedicated vehicle to transport workers on the site to avoid contaminating personal vehicles. These measures all point to a contractor who wants to get the job done safely.

In 1956, the Bay Bridge was named one of the seven engineering wonders of the world. Once the new east span is completed, the old span will be demolished. Will we see more workers lead poisoned on this job? That will depend on the safety program of the contractor who is awarded the project. Establishing pre-bid qualifications regarding the contractor's health and safety track record could help to ensure a safe job.

OHB Funded Four More Years to Prevent Worker Deaths

The California Fatality Assessment and Control Evaluation (FACE) program's purpose is to gain a better understanding of the causes of fatal work-related injuries in Los Angeles County by identifying and investigating work situations at high risk for injury. The FACE program has been part of OHB since 1992, and we recently received an additional grant award to continue the program through the year 2010. California is currently one of nine state health or labor departments awarded FACE cooperative agreements with NIOSH.

Each day in the United States, on average, 16 workers die as a result of a traumatic injury on the job. More than 500 people die on the job in California each year.

The goal of the FACE program is to protect workers in high-risk jobs or industries by learning and sharing the key lessons from past fatalities. The FACE investigator examines selected worker deaths in detail to learn the underlying reasons why they occurred. OHB then uses this information to develop and publicize practical solutions to improve job safety through communication with workers, employers, and industry associations.

Over the next three years, we will focus our investigations on two types of fatalities; those deaths that occur in highway work zones or involve machines will receive special attention. In addition, FACE will also examine the pattern of fatalities among two high-risk groups: young workers under the age of 18 and Latino workers.

Previous work by the FACE Program has led us to plan a special look at deaths among Latino construction workers due to falls. Our research showed that Latino workers in Los Angeles County had almost a 50% higher fatality rate compared with non-Latino workers between 1992 and 2003. We have identified the construction industry as a major source of employment within the Latino community. In 2005, there were approximately 81,000 Latino construction workers in Los Angeles County, comprising 56% of the construction workforce. Construction falls, in particular, continue to be a substantial risk to Latino workers.

Through discussions with Latino construction workers and their employers, we will work to develop new ways to communicate effective methods to reduce worksite falls. By focusing on Latino worker investigations, we will seek to develop effective prevention recommendations and improve our capacity to serve this population.

Two mechanics electrocuted when crane boom contacts power line

OHB investigated the deaths of two heavy equipment mechanics who were killed when the truck-mounted crane they were using touched an overhead power line. The 18-year-old crane operator had been employed for one year; the 40-year-old had 20 years of experience as a mechanic and had worked for the company for one month. The company had no written safety program and no worker training program.

What happened?

On the day of the incident, the victims were dispatched to a construction site to repair a scraper that had been used to grade the land for commercial development. Their employer had rented the scraper to the construction contractor.

The scraper was parked underneath a high voltage power line that carried 12,000 volts of electricity and ran directly through the construction site. The victims disconnected the broken part of the scraper and then used the truck-mounted crane to remove it for repair. The crane boom was being moved out of the way when it made contact with the overhead electrical line. Electrical current was sent down the boom, through the truck, into the boom control attached to the truck, and into the 18-year-old victim who was holding the control and touching the scraper. The 40-year-old victim was also electrocuted through contact with the scraper.

There was no documentation that either worker attended safety training, or understood how to safely operate a truck-mounted crane.

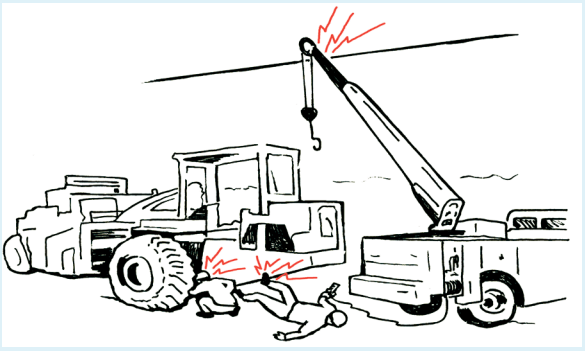
TRUE STORY

What was learned?

- Do not work near energized high-voltage lines unless necessary. If work has to be done near power lines, make sure that there is a plan to do the work safely, the plan is followed, and the workers have the right equipment to keep themselves protected.
- Make sure workers using cranes are fully trained and follow safe work practices.

For the complete investigation report:

www.dhs.ca.gov/ohb/OHSEP/FACE/faceindex.htm



Bird Flu: A New Threat to California

The world has been watching closely as a new avian influenza virus, also known as "bird flu," has spread in bird populations across Asia and other countries. There is great concern that this virus will mutate to one that can easily infect humans, causing a "pandemic"—an epidemic that covers a large geographic area.

The avian flu virus is transmitted by inhalation, contact with mucous membranes (eyes, nose), and ingestion of raw poultry products. Eating properly cooked poultry (to 170 degrees F) is not a risk factor for infection.

The new type of influenza now being found in birds, the H5N1 strain, has infected some humans, and the consequences can be very severe. As of April 11, 2007, there have been 291 confirmed human cases and 172 deaths in 12 nations from the H5N1 strain. The virus has not been found yet in the United States.

World Health Organization data show that nearly 60% of people infected with H5N1 have died of the illness due to seriously compromised lung function and immune suppression. Diarrhea and brain effects have also been noted.

Workers culling poultry in full protective gear, Cambodia, 2005.

Although avian influenza viruses usually do not infect humans, rare outbreaks of worker infections have been reported in the past. In 2003, eye infections and flu-like illnesses occurred in the Netherlands among workers who handled infected poultry (H7N7 strain). A veterinarian who had visited an affected farm died. In 2004, poultry workers in Canada got eye infections during an avian flu outbreak in poultry (H7N3 strain).

Workers currently at highest risk for illness from avian influenza are those having direct contact with sick domestic poultry or sick wild birds, or with surfaces contaminated by their feathers, saliva, or droppings. The disease has not yet been identified in bird populations or among workers in California.

If a flu virus that is highly infectious to humans creates an influenza pandemic, health care workers will be at high risk for illness when exposed to coughs, sneezes, or body fluids from infected patients. During a pandemic, other workers may also become ill as a result of exposure to infected persons at home, in the community, or at their jobs. It is estimated that businesses may experience a 30% absentee rate among their workers due to pandemic-related illnesses. It is important for all employers to be prepared for worker illnesses with contingency plans to minimize work interruption.

Workers who develop signs of illness should receive medical care according to guidelines. Suspected or confirmed influenza cases should be reported to the local and state health departments. Tracking those who have been in contact with ill workers may be needed to detect other affected people early.

Employers are responsible for developing an Injury and Illness Prevention Program (IIPP) that covers all workplace hazards faced by their workers. The IIPP should address pandemic influenza risks and work practices to prevent exposure and illness. This may include appropriate use of respiratory protection.

OHB's goal is to prevent worker illness due to pandemic and avian influenza. We have provided input into pandemic and avian influenza guidelines addressing workers in health care, zoos, the poultry industry, wildlife biologists, and other occupations. OHB is working with other concerned groups to ensure that California is prepared to protect both its workers and the general public from being affected by this disease.

Although we cannot predict how virulent a pandemic virus strain will be, we utilize ongoing research to recommend methods to protect high-risk workers and to minimize worker illnesses in the event of a pandemic.

Recommendations to protect high-risk workers

A comprehensive infection control program includes:

- Engineering and work practice controls
- Personal Protective Equipment (PPE) program
- Medical monitoring
- Worker training

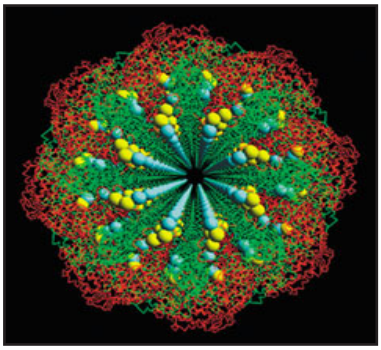
Federal OSHA has published a guidance document that includes recommendations from the Centers for Disease Control and Prevention on vaccines, antiviral drugs, hygiene, and medical monitoring. Fact sheets are available in English and Spanish. Cal/OSHA guidelines cover types of PPE (gloves, coveralls, respirators, boots) and decontamination procedures.

These guidelines are available on the Web: *www.osha.gov/dsg/guidance/avian-flu.html* and *www.dir.ca.gov/dosh/DoshReg/PP_Matrix_DoshReg.html*

Nanotechnology Raises Worker Health Concerns

As new technologies are introduced into the California economy, OHB works to identify potential health and safety risks to workers. Nanotechnology is emerging as an important new field. Several "nanotech" (nanotechnology-based) materials are already manufactured and used for sunscreens, cosmetics, medical uses, paints, and electronics. California is poised to be a leader in this new field with its universities and businesses active in research and development.

Nanotech research could lead to the development of new products that will benefit society – cleaner energy production, new methods to diagnose and treat diseases like cancer, and products to clean up contaminated air, water, and hazardous waste. Because of the potential benefits of nanotech, there is a tendency to rush the development process before the potential costs or negative impacts have been fully explored.



Nano-materials are designed to have unique properties.

The unique properties of the new nano-materials may pose new risks to workers, consumers, the public, and the environment. Unfortunately, history includes many examples where new chemicals or products were discovered to be harmful or deadly to workers only after widespread use. Asbestos, gasoline additives such as lead and benzene, and the drycleaning solvent perchloroethylene are just a few examples. That is why OHB, NIOSH, and others are working to make sure that current nanotech research activities include a serious exploration of the potential risks to workers. Here is some of what we have learned so far.

Nano-materials have special properties

Nanotechnology is a set of powerful techniques for custom designing useful new materials by manipulating chemical structures at extremely small sizes. "Nano" refers to nanometers – one-billionth of a meter, or 1/50,000th of the thickness of a human hair. New materials are being designed and built atom by atom. This is made possible through the use of advanced microscopes and tools.

What are some of the novel properties of nanotech materials? Nanoparticles have enormous surface area relative to their mass or weight, resulting in special properties and behaviors. Their large available surface area makes them powerful catalysts, medicines, and sensors. Everyday materials with well-understood properties can behave very differently as nano-sized particles. Solids such as gold can turn to liquids at room temperature. Insulators may become conductors. Some metals are hundreds of times more combustible when in nano-sized particles, increasing the risk of explosions. Very slight changes in a nanomaterial can result in big changes in its properties and behavior.

Potential hazards of nanotechology

Current knowledge about ultrafine particles, such as welding fumes and diesel exhaust, provides clues about how nano-sized particles may behave in the body. All three routes of exposure – through the skin, breathing, and ingestion – can occur. Once inhaled, nanoparticles are highly mobile. They can enter the bloodstream, travel throughout the body, and may even cross the blood-brain barrier. Some chemical particles concentrate in specific locations, such as the kidney, or reproductive tissues. Nano-sized materials might also be able to alter the regular functioning of the body's enzymes and proteins. The long-term toxic effects have yet to be assessed.

New methods are needed to measure the "dose" people receive when inhaling nano-sized particles. We also need to evaluate how well ventilation systems and respirators work, and how well current filters can trap nano-sized particles.

Potential hazards to workers need to be explored for each phase of the life cycle of new nanotech materials: from research and development to production, distribution, use, and final disposal. Maintenance workers involved in cleaning and waste disposal activities at facilities producing nanomaterials may face increased risk.

Current efforts to protect workers

There are no new regulations specifically to protect nanotechnology workers. Many Material Safety Data Sheets (MSDSs) do not disclose ingredients present in nanoparticle form; they only list the general chemical name (e.g., titanium dioxide). This can mislead employers and workers, who may assume that the health hazards of the nano-sized material are the same as its original form. Manufacturers should provide updated MSDSs, and employers should inform and train workers about potential new hazards. Current Cal/OSHA standards covering laboratory safety and Injury and Illness Prevention Programs can provide a framework for protection. NIOSH has published interim guidelines on safe approaches to nanotechnology and maintains an online library.

Nanotech Web sites for more information:

- *www.cdc.gov/niosh/topics/nanotech/*
- *www.wilsoncenter.org/nano/*
- *www.environmentaldefense.org/page.cfm?tagid=77*

California Department of Health Services
Occupational Health Branch
850 Marina Bay Parkway
Building P, Third Floor
Richmond, CA 94804-6403

Tel. (510) 620-5757
Fax (510) 620-5743
www.dhs.ca.gov/ohb

Arnold Schwarzenegger, Governor
State of California

Kimberly Belshé, Secretary
Health and Human Services Agency

Sandra Shewry, Director
California Department of Health Services

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Occupational Health Branch Mission Statement

To promote a safe and healthy work environment for all Californians through a comprehensive and effective program of prevention activities, public health leadership, scientific excellence, and collaboration with stakeholders.

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Toll-free to California callers:

Workplace Hazard Helpline (866) 282-5516
Provides information to assist in identifying, understanding, and preventing workplace health and safety hazards.

Lead in the Workplace Information Line (866) 627-1587
Provides information in English or Spanish about work-related lead poisoning and how to prevent it.

Pesticide Poisoning Helpline (800) 970-6680
Provides information to assist in identifying and preventing work-related pesticide illness.

A sample of OHB publications online at www.dhs.ca.gov/ohb

Fact Sheets
∞ Methylene chloride (updated)
∞ Molds in indoor workplaces (updated)
∞ Diacetyl health hazard alert

Preventing Fatalities
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