

# Occupational Health Management™

*A monthly advisory for occupational health programs*

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## OSHA to propose ergonomics standard to prevent repetitive motion injuries

*But can such a measure have any impact or even survive?*

The Clinton administration will release a proposed ergonomics standard this summer, renewing the fight to establish a rule that would compel U.S. employers to protect workers from repetitive motion injuries and other ergonomic-related disorders. Past efforts have failed, so there is doubt as to how well the proposal will be received.

*Occupational Health Management* has learned the proposal will be released in a very different form from previous ergonomics proposals and different from almost any previously released standard. The proposal will be much smaller in scope than previous ergonomics proposals, in direct response to the vehement objections that resulted in the defeat of earlier versions. **(For more on how the previous proposals failed, see story, p. 27.)**

This summer's proposal will not resemble past ones at all, says **David Cochran, PhD, PE, CPE**, professor of industrial engineering at the University of Nebraska in Omaha and special assistant for ergonomics at the Occupational Safety and Health Administration in Washington, DC. Many details of the proposed standard are still to be determined, but Cochran says the first thing that will get people's attention is the plain language the standard is written in. OSHA has committed itself to writing standards as simply as possible, and the ergonomics proposal will be one of the first to

## EXECUTIVE SUMMARY

- The Occupational Safety and Health Administration will release another proposed ergonomics standard this summer, but there is considerable doubt as to whether it will survive and whether it will have much impact on occupational health and safety.
- The proposed standard will be in plain language, not the traditional OSHA format.
- Only manufacturing and manual handling jobs are covered.
- The standard's requirements are very simple and should not pose much burden to employers.

avoid the formal, highly complex format that occupational health professionals have come to expect from OSHA. "Some people are going to look at it and wonder where's the rest of the standard," he says. "Most of it is in a question-and-answer format to make it very easy to understand."

### ***Narrow scope misses many employers***

In contrast to previous proposals that covered nearly all U.S. employers, the new proposal will apply only to manufacturing and manual-handling jobs such as those in warehouses. Office and retail workers, most notably, are not covered.

While OSHA would like to see a broader scope for the ergonomics rule, Cochran says the proposal will be limited to only those job types in which the risk of injury is seen as the greatest and in which intervention efforts are most clearly worthwhile.

"We're thinking of expanding the rule to general industry, but that's not the way the proposal is written now," he says. "Computer users would be included if we expand it to general industry, but they're not covered in the rule yet."

In addition to the narrow scope, the proposed ergonomics rule would be simple when compared to most OSHA standards. Cochran provides this outline of the basic components of the proposed standard:

**□ Employers must have a system for recording ergonomic-related injuries and illnesses.**

This is the heart of the proposed standard, and for many employers this will be the entire requirement. Employees would have to be educated on musculoskeletal disorders and understand how to report hazards and injuries to the employer. If there are no injuries, the employer's responsibility stops there.

"The injury would have to be something directly related to what they're doing in that job," Cochran says. "If the employee slips and gets a back injury, that may not trigger any other obligations under this rule because it's not directly tied to the job activities."

**□ If a musculoskeletal disorder occurs, the employer must respond.**

The expected response will be spelled out in the proposed standard, but Cochran says it will follow typical occupational health protocol. Employers will be expected to investigate the hazard, develop ways to address it, and implement the solutions.

That's essentially the entire proposed ergonomics standard, Cochran says. Instead of requiring employers to conduct extensive analysis of jobs and respond to hazards in specific ways, as previous proposals did, the new proposal will simply require that some employers keep track of musculoskeletal disorders and respond in some way when they are found. That's not much, as federal safety standards go, but it could be OSHA's way of getting a foot in the door.

Cochran says the ergonomics experts and OSHA leaders were well aware of the proposed standard's history when crafting the latest draft, and they did their best to create one that would be accepted. Several problematic parts of previous standards were intentionally omitted, such as a checklist for compliance and requirements that employers implement corrective action throughout the entire workplace.

Under the new proposal, an employer may implement corrective action for just one hazardous job in the workplace instead of applying that solution across the board.

"A lot of employers will look at this proposal and realize they're already doing this," he says. "The standard gives them a little more guidance, explaining what OSHA expects so that everyone is under the same umbrella. We're trying to have an OSHA standard that is protective and not overly burdensome."

One observer says the standard's simplicity could limit its usefulness for occupational health providers. **Pat Stamas**, RN, COHN, president of Occupational Health and Safety Resources in Dover, NH, suggests that OSHA watered down the proposal too much based on previous criticism.

"If it were to give clear definitions of what actions are to be taken, rather than just saying you have to be proactive and take some sort of

## ***COMING IN FUTURE MONTHS***

■ CDC addresses worker stress

■ Method to boost marketing by surveying clients

■ Computer hazards pinpointed

■ Reaction to ergonomics proposal

■ Some employers fight against OSHA workplace safety and health programs

corrective action, it would be much more valuable," she says. "Unless OSHA says you have to do it and do it this way, employers are going to find it easy to look the other way."

But on the other hand, Stamas says she does not expect any significant opposition from employers if the standard is as simple as it sounds at this point.

"It sounds like what most employers are already doing, so they probably won't oppose it," she says. ■

## Past efforts don't bode well for OSHA proposal

The last time Clinton administration officials tried to enact a federal ergonomics standard, Congress soundly rapped them on the knuckles and suggested, rather strongly, they not try those shenanigans again. Another proposal is about to be offered, but past experience suggests occupational health professionals should not get their hopes up.

In June 1995, the much debated ergonomics proposal from the Occupational Safety and Health Administration in Washington, DC, failed with a resounding thud.

The administration had been promising an ergonomics standard since 1990 and had released proposed versions of the standard, progressively weakening the proposals in response to employer protests. A 1994 draft would have covered all U.S. employers, about 6.1 million employers with 96 million employees, but the 1995 proposal would have covered only employers with evidence that hazards exist, about 2.6 million employers with 21 million employees.

### *Too much burden on employers?*

The strongest criticism came from business leaders who felt the proposed standard would put too much of a burden on employers, even after the standard was greatly watered down. Those complaints were well-received by Congressional leaders, who exerted extraordinary pressure on OSHA.

As an executive agency, OSHA technically has the power to issue an ergonomics standard no matter how much Congress protests. But as

a practical matter, Congress exerts great influence on the agency by manipulating its funding. In the 1995 squabble, Congress decisively won by threatening to cut \$3.5 million from the OSHA budget — coincidentally the estimated cost to OSHA of implementing an ergonomics standard.

Soon after, Barbara Silverstein, the Clinton administration's top official in charge of creating the ergonomics standard, resigned on the same day that OSHA director Joseph Dear issued a statement saying no standard would be forthcoming any time soon.

"In the face of Congressional intervention in OSHA standard setting, it is not now possible to publish a standard which has the breadth necessary to attack this problem," Dear said in his June 12 statement.

"Given the magnitude of the problem, OSHA must continue development of a standard which will have support from reasonable people. OSHA also will use its resources to support education, training, consultation, and enforcement activities to address this workplace epidemic," he stated.

But even at the time, most parties agreed the ergonomics proposal was not dead but merely shuffled off to a back room until it could be resuscitated. Rep. Tom DeLay (R-TX), the House majority whip, pointed to the ergonomics proposal as a prime example of overly intrusive, costly, and unnecessary government regulations that are particularly burdensome to smaller employers, but said he expected it to return in some form.

DeLay's spokesman in Washington, Jim Lafferty, told *Occupational Health Management* in June 1995 that DeLay expected "them to present the standard again and we're prepared to fight it just as hard next time."

Both DeLay and Lafferty were unavailable for comment. ■

### **SOURCES**

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# Program reduces workers' comp, disability 24%

*Workplace violence in hospital targeted*

When you're having lunch with 1,000 dangerously mentally ill men, you really hope everyone has a good meal and walks away happy. Otherwise, a fork can be a deadly weapon.

Mealtime violence had become a major threat to patients and staff at Atascadero (CA) State Hospital for dangerous mentally ill men. The hospital has 1,700 staff and in just one year at the 1,000-bed psychiatric hospital, 134 staff members were injured through patient-related violence. Most of the injuries occurred at mealtimes and some were life-threatening. The facility recently won praise from the state occupational health department and a Codman award from the Joint Commission on the Accreditation of Healthcare Organizations for its innovative quality efforts in addressing a very serious problem.

Atascadero's experience is being hailed as a good example of how occupational safety and health principles can be applied to violence in the workplace, a pervasive problem that recently has gained more attention from the Occupational Safety and Health Administration and other safety groups. A quarter of Atascadero's nursing staff were suffering OSHA-reportable injuries from violence every year, says **Colleen Carney Love**, DNSc, RN, director of the clinical safety project.

"This is not a typically recognized occupational injury, but we decided to treat it as one because this is an industry in which violence is a daily risk for the staff," she says. "We needed to address the problem just as methodically as if we found that our employees were constantly

## EXECUTIVE SUMMARY

Violence against staff and patients was reduced in a California hospital for the mentally ill through the use of proven occupational safety and health initiatives.

- Patients were involved and proved key to finding solutions.
- \* In addition to safety concerns, violence against staff had become a serious cost issue.
- \* The solutions improved safety and also resulted in a 24% reduction in workers' comp and disability costs.

## Not all ideas will work out when reducing violence

Despite the overall success of the violence reduction program at Atascadero (CA) State Hospital, the team had a few false starts, says **Colleen Carney Love**, DNSc, RN, director of the clinical safety project.

"If we had taken our first blush ideas, we would have come up with some crazy schemes," she says. "We first thought we needed more officers, metal detectors, maybe even build a wall in the dining area. We weren't thinking outside the box. Fortunately, we kept going and eliminated those ideas as we went along."

The team also considered providing meals on the patients' housing units, instead of bringing them to the dining room for meals. That was prompted by data that showed the incidence of violence was lower on weekends when patients were allowed more freedom to skip meals and vary mealtimes. Providing meals on the housing units proved too labor-intensive, and some patients did not like being kept in the same area for meals.

In the end, the team's safety recommendations were considered a major success, as evidenced by the sharp reduction in injuries and also by the hearty endorsement from the Joint Commission on the Accreditation of Healthcare Organizations.

"We got Accreditation with Commendation, no small feat for a public sector industry," Carney Love says. "Our experience shows that you can tackle a problem that a lot of people see as an inevitable part of the job." ■

hurting themselves in a physical task."

Once the hospital leaders decided to take decisive action against the problem, violent events in the dining room were reduced by 40% in one year. Attacks with silverware, the natural weapon of choice at mealtimes, were eliminated. By switching to plasticware, the facility also saved 70 nursing staff hours a day that had been devoted to silverware control procedures in the dining room, the equivalent of 14.5 full-time nursing staff positions per year.

The constant injuries cost the hospital an average of \$766,290 per year, with each violence-related staff injury costing an average of \$5,700 and 43 days of lost work, Carney Love says.

In addition, the violence reduction strategies contributed to a 24% reduction in the hospital's workers' compensation and industrial disability leave expenditures for fiscal year 1994/1995. The

## Removing silverware takes bite out of mealtime risk

The team at Atascadero (CA) State Hospital initiated a number of safety initiatives to reduce the risk of violence and resulting injuries at mealtimes. Here are some highlights:

- ✓ **Silverware was replaced with plasticware.**  
There had been an average of seven silverware attacks per year, on patients and staff, for the past 15 years. Silverware had been used instead of plasticware partly because silverware is seen as more normal than plastic, and normalizing the patient's environment is a significant goal in the patient care plan. But patients made it clear they actually preferred plasticware, giving up a bit of normalcy in return for increased safety. No one has been attacked with the plasticware.
- ✓ **Healthier patients were allowed to leave the dining room sooner.**  
The data showed that 35% of the violent incidents occurred while patients were waiting to leave after eating, so the policy was changed to allow healthier patients to leave when finished. The average time each unit's patients spend in the dining room was reduced by 15 minutes.
- ✓ **Patients were given more options instead of waiting.**  
Waiting tended to aggravate patients, pushing some over the brink and into a violent episode. To reduce the waiting time, particularly for patients waiting to leave the dining room after the meal, the facility opened the courtyard and gym to provide more options.
- ✓ **Staff were educated about the initiatives and encouraged to be more courteous.**  
Patients had complained the dining room staff were discourteous, not a small complaint when it comes to 1,000 dangerously mentally ill men. What the patients perceived as discourteous behavior often was enough to prompt some into a violent rage, so the hospital held 20 inservice classes for the dining room staff. The classes focused on the problems and rewards of working with the mentally ill. ■

program has been so successful that the hospital received funding from the California Department of Industrial Relations for further research.

"The state occupational health department is

used to dealing more with back injuries and slips and falls, but we submitted a grant request that used traditional occupational health strategies to reduce violence," she says. "We used the same principles of studying the risks, explaining them to workers, and crafting a response that included environmental changes, behavioral and policy changes, and employee education."

Quality assessment (QA) and total quality management (TQM) principles also were used to facilitate the improvements. Carney Love and others at Atascadero suggest the same approach could be used in other workplaces where violence is a threat. Though a hospital for the dangerously mentally ill may seem a unique setting, they say the same strategies could be applied in other settings. **(For details on the strategies the team implemented, see box, at left.)**

The turnaround required a new way of thinking at the facility, says **Cindy Ramage**, RN, the standards compliance coordinator. She and others at the facility put together a quality assessment team with instructions to take a hard look at the violence at the facility and take whatever steps necessary to reduce it. Mealtimes were clearly the most risky time for patients and staff, so that was the team's first focus, Carney Love says.

"We've made it explicit that we won't accept violence as part of the job, which is the way it's been accepted in mental health," Carney Love says. "The issue of violence really is not addressed as vigorously as it should be in many settings, and this is an industry where it sometimes is just taken as a part of the workplace — something that had to be accepted."

The team already realized that mealtimes were an especially emotional time for psychiatric patients, with large groups brought together, often against their will, and required to follow certain procedures in order to eat. The logistics exacerbated stress levels that already were high, and often, patients exploded in rage.

Even though the problem was a familiar one, the team addressed it by first collecting data on exactly what sort of incidents were occurring. Without specific data, the team would not be able to develop effective solutions, says **Carol Constien**, RN, risk management coordinator.

"Mealtimes triggered a high level of incidents and the injuries from those incidents were much more severe than injuries that occurred elsewhere," she says. "We needed to know just how they were happening."

The team involved the patients in the solution

## SOURCES

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because they were most directly involved and at high risk of injury. Their involvement was consistent with Atascadero's whole philosophy of seeking patients' input in their care and their environment. Patient representatives surveyed the patient population, providing valuable advice to administrators about realistic ways to reduce injuries. That turned out to be important when outside regulators came in and took a look at some of the changes.

"When we told them we were going to switch to plasticware, there was a negative reaction because, from an outside perspective, that seems less normalized," Carney Love says. "But we were able to show that the patients themselves supported the move. Patient anxiety is a lot lower now that the person across the table just has a plastic fork when he gets angry, not a whole complement of silverware in his hands." ■

## Reader Question

### Respirator exams not required annually

**Question:** A reader question in the January issue of *Occupational Health Management* addressed the need for annual respirator fit testing, saying the testing is necessary on an annual basis. But what about the respirator exam? Is that also necessary whenever a fit testing is required?

**Answer:** Respirator exams are not required on an annual basis, says **Craig Moulton**, an industrial hygienist with the Occupational Safety and Health Administration's Office of Health Compliance Assistance in Washington, DC.

The distinction between "respirator exams" and "fit tests" is important for understanding when the tests are necessary. A "respirator exam" usually means the overall physical examination of an employee to ensure he or she is healthy

enough to use a respirator without exceptional risk. A fit test is the examination that ensures the respirator fits properly on the worker's face.

The OSHA respirator standard, 42 CFR Part 84, requires that all tight-fitting respirators be fit tested on the employee. (But fit tests are not necessary for any respirators worn voluntarily by the worker or for any type of loose-fitting respirator, even if it is required by OSHA or the employer.) The employee must pass a fit test before being initially cleared for respirator use, and then "an annual fit test is required after the initial fit test." Also, fit tests are required if the employee's physical condition has changed in a way (i.e., weight gain or loss or injury) that could affect respirator fit. New fit tests also are necessary if the employee switches to a respirator with a face mask that fits differently.

For what some occupational health providers call "respirator exams," the requirements are different. Here is where some of the terminology can be confusing. OSHA says the employee must undergo an initial "medical determination" before being cleared for respirator use, but note that OSHA uses the term "medical determination" as the initial step, not "respirator exam" or "medical evaluation."

The medical determination required by OSHA begins with a written questionnaire in which the employee is asked about various health conditions. That can be followed by an actual medical evaluation, but it does not have to be.

"The medical evaluations are more event-driven, so they're performed whenever the employee suffers a change in health, or if the physician notices something that could affect respirator use," Moulton says.

*OHM* enlisted help to understand the rule from **William Patterson**, MD, FACOEM, MPH, chairman of the Medical Policy Board at Occupational Health and Rehabilitation in Wilmington, MA. He explains that OSHA does not require any hands-on physical examination before respirator use unless the person reviewing the questionnaire concludes that an examination is warranted in order to reach a determination about the employee's ability to safely use a respirator.

The standard requires the employer provide a copy of its written respirator program to the occupational health professional overseeing respirator use. Based on a review of that respirator program and/or individual employee questionnaires, the provider may recommend to the employer that a physical examination or pulmonary function test (PFT) be performed.

After that initial questionnaire review (and possible exams), subsequent questionnaire reviews are required by OSHA in these situations:

- The employee reports medical signs or symptoms related to the ability to use a respirator.
- The supervisor or respirator program administrator informs the employer that the employee needs to be reevaluated.
- Information from the respirator program, such as observations during fit testing, indicates a need for further evaluation.
- There is a change in workplace conditions, such as the addition of protective clothing that may result in substantial increase to the physiological burden placed on the employee.

Patterson notes, however, that these are only the minimum expectations of OSHA. With his own clients, Patterson often recommends more detailed and individualized examination of employees wearing respirators to ensure their safety.

While the initial medical questionnaire may be effective in detecting most conditions that could affect respirator use, he points out that some workers may not answer the questions truthfully if they fear job restriction.

Some conditions, such as hypertension, may be unknown to the worker and therefore would not be detected in the questionnaire but likely would be detected in a physical examination. A physical examination also offers the opportunity to monitor any health changes from a hazardous environment, reinforce the employer's respirator safety principles, encourage smoking cessation, and obtain baseline assessments for occupational lung disease.

For those reasons, Patterson suggests taking a liberal approach to recommending physical examinations and PFTs when the initial questionnaire leaves any doubt as to the worker's ability to use a respirator safely or when exposures and working conditions represent meaningful risk. ■

## Fraud warnings advised for workers' comp checks

*Couldn't hurt, but do warnings help?*

**F**raud warnings printed on workers' comp and disability checks are effective in discouraging fraud by workers, some experts say, so much so that they recommend extending the same approach to documents in the occupational health clinic.

The warnings have been used on checks by some insurers for years, but it is unclear just how effective they are. Some critics have questioned how well the warnings actually discourage fraud, but two organizations battling workers' comp fraud recently have come out in favor of the warnings. **Howard Goldblatt**, director of government affairs for the Coalition Against Insurance Fraud in Washington, DC, says the group supports the warnings even though there is little evidence about effectiveness.

"We hear anecdotal evidence about people being turned away from fraud when they see the warning on the back of the check, but we don't know," he says. "One concern is that, to be effective, the worker would have to have the check in hand already, see the warning, and decide not to cash it."

That may seem unlikely, so Goldblatt suggests the same type of warning may be more effective on other documents. Some states already require

the worker to sign periodic statements attesting that they are eligible to continue receiving benefits and not participating in any type of fraud. Because those statements require a proactive declaration that is not directly tied to a check, the worker must make a conscious effort to lie when returning the declaration, rather than just ignoring the warning as he or she cashes a check.

### *States want individualized warnings*

But on the other hand, there appears to be no downside from printing a fraud warning on the workers' comp and disability checks, Goldblatt says. The only thing that troubles anti-fraud experts is the recent effort by some states to require a standardized warning on all such checks issued in the state.

Mandating specific language can be problematic because most insurers process checks from central sites and would be hard pressed to make sure checks going to one state have the proper warning on them and checks going to another state have a different warning on them.

"We think it's fine if states want to mandate that there be some warning against fraud, but we're hoping we can convince the states to allow for discretion on the part of the insurers to allow similar language as long as it meets the meaning of the state's required warning," he says.

Currently, 24 states require fraud warnings on insurance forms or checks, and two-thirds allow insurers to use warnings that are very similar to

## SOURCES

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the state's suggested warning.

Another group fighting insurance fraud also endorses fraud warnings, with the same caveat that there is little evidence of effectiveness but they can't hurt. The Alliance of American Insurers in Downers Grove, IL, says the warnings on checks may provide a weekly reminder to the worker.

**Kirk Hansen**, director of claims, says the warnings "can mitigate loss to some degree and minimize

malingering. If it cuts that down even a little, the warnings are worth it."

That idea could be extended further by using the same sort of fraud warnings on other documents within the occupational health system, Hansen suggests.

He sees no legal or ethical reason not to pass on such warnings to the worker at every opportunity, and he notes that employers may be pleased to see that a health provider is working diligently to discourage malingering. The earlier the warning is provided, the more effective it will be, he says.

"I could see the fraud warnings on many other documents — any document that the claimant will come in contact with or have reasons to read or submit to the insurance company," Hansen says. "The origin of a fraudulent claim is sometimes right there in the doctor's office, so if you can put a stop to it then, the fraud may never get to the point where a check is sent with a warning." ■

## OSHA Actions

### Scaffold company cited after collapse in NYC

The Occupational Safety and Health Administration has cited a New York scaffold company for safety violations after an accident that killed a building resident near New York City's Times Square.

OSHA proposed penalties of \$26,000 against Universal Builders' Supply of Mount Vernon, NY, for four alleged serious violations of federal safety standards. The company can contest the penalties.

OSHA took the action as the result of an investigation following the July 21, 1998, accident at Broadway and 43rd Street in Manhattan, in which scaffolding being used in the construction of the 4 Times Square Conde Nast Building collapsed. A resident of the 14-story Woodstock Hotel, on the opposite side of 43rd Street, was killed when a section of the elevator tower fell across the street and went through the hotel's roof. Twelve workers on the building site received minor injuries.

The government agency cited the employer for these alleged serious violations:

□ failure to ensure that mast tower bolts were maintained for tightness;

□ failure to provide scaffold components designed for four times the maximum intended load;

□ failure to provide scaffold components designed by a registered professional engineer;

□ failure to provide all necessary scaffold bracing.

OSHA cited the company for three alleged serious violations June 26, 1998, for an accident in which a worker was killed by a descending hoist. The violations cited included failure to properly guard the hoist shaft and failure to shut down the hoist when employees worked in or near the shaft. The company has contested the violations, which carry proposed penalties of \$9,000, and declined to comment. ▼

### Proposed \$1.6 million fine for unguarded machine

More than 60 cases involving crushed fingers on unguarded machines at an Ohio auto parts manufacturer have resulted in more than \$1.6 million in proposed penalties against Tomasco Mulciber in Columbus.

U.S. Secretary of Labor Alexis Herman announced the proposed penalties recently, saying that an inspection by the Occupational

Safety and Health Administration identified 80 instances of machine-guarding deficiencies contributing to serious hand injuries at the Columbus plant in the past four years. The accidents included finger amputations.

“This company allowed workers, including many temporary employees, to work on unguarded machines in spite of the inordinate number of injuries,” Herman says. “It’s disturbing that many guards already in place were deliberately bypassed. The apparent indifference and reckless disregard to workers’ safety and health exhibited at this plant will not be tolerated and warrants stiff penalties.”

OSHA cited the company for 28 alleged willful violations of machine-guarding requirements for power presses and resistance-welding machines, with proposed penalties totaling \$1.57 million. OSHA also cited the company for 17 alleged serious violations of the lockout/tagout, mechanical power press, confined spaces, and electrical standards. Those alleged violations resulted in \$71,000 in proposed penalties.

**Charles Jeffress**, assistant secretary of labor for OSHA, adds that more than two-thirds of the welding and assembly machines inspected at the plant were not guarded. Inspectors found 26 unguarded resistance welding machines. Jeffress says employees were subject to serious hand injuries “because the plant’s management refuses to adhere to basic safety regulations.”

Tomasco employs 460 permanent workers and 160 temporary workers at the Columbus plant, building front-end frames for Honda of America. OSHA conducted the recent inspection as part of the agency’s Interim Targeting Plan to inspect companies with the highest injury and illness rates. Tomasco was targeted because it had a lost workday injury and illness rate of 13.3 — nearly double the national rate of 7.5 for auto parts manufacturing companies. A review of the company’s injury records revealed a high number of crushed-hand injuries, so OSHA conducted a comprehensive safety and health inspection.

OSHA officials note the company’s temporary workers were at exceptional risk of crushing their hands, suffering more than two-thirds of the injuries. Temporary workers made up one-fourth of the plant’s work force, but they were nine times more likely to be injured on a machine, according to OSHA.

Tomasco has been inspected by OSHA five times since 1988, all in response to formal employee complaints. ▼

## Lockout/tagout violations blamed for grisly accident

A Massachusetts company has been fined \$115,500 for a gruesome accident that illustrates why the lockout/tagout standard is so important.

The Occupational Safety and Health Administration cited Atlantic Coast Fisheries Corp. in New Bedford, MA, for alleged willful and serious violations related to the July 30, 1998, death of a worker. According to an OSHA report, the accident occurred when two employees of the plant’s rendering department were cleaning the inside of a large ribbon blender, which is used to process remnants. A cleaning hose accidentally brushed up against the blender’s on/off switch, activating the blender and causing its blade shaft to begin rotating.

One worker was able to grab an overhead pipe and pull himself to safety, but the second worker suffered fatal injuries when he became caught in the rotating blade. OSHA’s lockout/tagout standard requires that such machinery will be shut down and its power source physically locked out before workers clean, service, or perform maintenance. Among other measures, the standard requires employers to develop and use machine-specific lockout procedures, train employees in those procedures, annually review its lockout program, and ensure lockout devices are affixed to the power source before employees begin working on the machine.

### *No procedures + no training = tragedy*

OSHA inspectors determined that in this case, the blender’s power source was not physically locked out, the company had not developed lockout procedures for the three blenders at the work site, and employees had not received lockout training. The company had not reviewed its existing lockout program for the past six years, according to OSHA.

Atlantic Coast Fisheries Corp. processes frozen fish and employs 255 workers at the facility. The government agency also cited the company for other safety violations, including unguarded machinery, a blocked and unmarked exit door, blocked access to an eyewash, deficiencies with respirators, and improperly maintained fire extinguishers. ■

# NIOSH warns of CO fumes after using explosives

Safety officials are warning occupational safety and health professionals about a deadly hazard that can occur when explosives are used in conjunction with sewer construction projects. In some circumstances, deadly levels of carbon monoxide can be produced and threaten workers.

Carbon monoxide (CO) is an odorless, colorless gas that can cause illness and death by asphyxiation. Although many workers understand the dangers of CO toxicity, occupational CO exposure can occur from unrecognized sources, according to the recent warning from the National Institute for Occupational Safety and Health (NIOSH) in Cincinnati. In a recent incident, three cases of CO poisoning in a confined space, including one fatality, were caused by CO migrating through soil after nearby use of explosives.

A municipal sewer project involved the installation of new pipes and manholes. Explosive blasts were used to break up rock layers 6 feet below the surface before excavating pipeline trenches and manhole pits.

On the day of the fatality, a construction crew installed a 12-foot-deep manhole without incident. After the crew left the area, 265 pounds of nitroglycerin-based explosive in 20 boreholes, each 18 feet deep, were detonated 40 feet to 60 feet from the manhole. A worker who entered the manhole 45 minutes after the explosion collapsed within minutes, and two co-workers descended into the manhole to rescue him. One rescuer retrieved the unconscious worker before collapsing on the surface, and the other rescuer died in the manhole. All involved construction workers had elevated blood levels of carboxyhemoglobin, indicating they had inhaled air containing high CO concentrations.

An investigation determined that carbon monoxide released from the explosion had migrated through the soil into the manhole. CO concentrations in the bottom of the manhole two days after the incident were 1,905 parts per million (ppm), well above the immediately dangerous to life and health (IDLH) concentration of 1,200 ppm. Tests following ventilation of the manhole showed that high levels of CO reappeared as a result of continued diffusion from the surrounding soil. Subsequent monitoring of the manhole showed a decline in CO levels over the next eight days.

NIOSH says this report is apparently the first occupational fatality from this type of CO exposure, though nonfatal CO poisonings have been reported in residential basements following nearby use of subsurface explosives.

Also, NIOSH notes this incident involved a "chain-reaction" death, a well-known danger associated with confined space rescues. Chain-reaction deaths are so named because after the first victim is found in a confined space, a rescuer enters without proper precautions and is overcome, a subsequent rescuer enters and is likewise overcome, and so on. Chain-reaction rescuer fatalities have accounted for 36% of the deaths in confined spaces.

NIOSH advises that all manholes should be considered confined spaces with potentially hazardous atmospheres, and appropriate air monitoring should be conducted before each entry into a manhole, as well as during worker occupancy. Even if appropriate monitoring had been conducted earlier in the day for this incident, the fatality might have occurred if the manhole had not been monitored for CO after the blasting.

*[For free information on CO generation by explosives, call NIOSH Pittsburgh Research Laboratory at (412) 892-4213. For free information about the hazard of confined spaces and procedures to protect workers, call NIOSH at (800) 356-4674, or visit the Web site at <http://www.cdc.gov/niosh/homepage.html>.] ■*

## Consider safety, health issues in Y2K plans

Occupational safety and health professionals have been warned that the Y2K computer problem will pose threats to worker safety, and now the National Institute for Occupational Safety and Health (NIOSH) in Cincinnati is offering specific advice on how to respond.

The Y2K problem, which threatens to cause havoc when some computers fail to recognize the two-digit year "00," can affect a host of safety systems. In a special advisement issued recently, NIOSH urges occupational health professionals to pay special attention to any equipment or systems that contain embedded microchips.

"A major problem is that embedded microchips and software with date-dependent functions are ubiquitous in process control operations, controlling everything from power grid systems

to ventilation systems," NIOSH warns. "The difficulty lies in identifying which components contain date-dependent functions and which software applications use yearly dates as data points. Few organizations have an inventory of their computer program source codes or even the sub-components of their process-control systems."

Typically, process-control components are linked into larger systems involving a feedback mechanism. This results in inter-connected systems, so that when one unit fails, they all fail, not unlike a string of Christmas lights. Finally, the problem can occur at any level of the system: the computer clock, the basic input/output system (BIOS), the operating system, the application software, or the data held.

NIOSH provides these examples of systems that may fail and affect the safety and health of workers: The electrical supply, including backup lighting and generators, could fail and hamper entry and exit from work sites. Fire control systems could fail and leave workers unable to know of a fire and fire location. Valve control systems could malfunction and pose dangers from hazardous materials. Inactive security systems and cameras could leave workers without the ability to assess potential dangers.

In general, systems that operate using embedded microchips typically fall into one of these four categories:

**1. Individual microprocessors** (e.g., temperature sensors, smoke and gas detectors, circuit breakers, etc.).

**2. Small assemblies of microprocessors with no timing functions** (e.g., flow controllers, signal amplifiers, position sensors, valve actuators, etc.).

**3. Subassemblies with a timing function** (e.g., switches/controllers, telephone exchanges, elevators, data acquisition, monitoring, and diagnostic). Sensors in these subassemblies systems usually send data to computers that run database programs. Y2K failures may occur within or between subassemblies and even before the year 2000 because the system may project a future action that would not be recognized.

**4. Computer systems used in manufacturing or process control**, which also usually include embedded microchips. System failures would be expected because the software and hardware are usually based on commercial data processing languages that were developed years ago, such as COBOL and FORTRAN.

NIOSH advises that items in categories 1 and 2 are least likely to fail. Items in category 4 are most

likely to fail. NIOSH says the highest priority in the event of Y2K failure should be given to those systems that have the greatest impact on the safety and health of workers, as well as the public, followed by those systems that have an impact on business operations. The task can be made difficult when the two systems are intertwined in production-oriented industries. ■

## Male, older workers at risk for cold-related injury

Employers and occupational health providers should take extra steps to protect workers exposed to cold weather conditions, and the U.S. Labor Department is offering tips to help avoid serious injury.

More than 700 people die of hypothermia in the United States every year, and the Labor Department cautions that some workers can be at increased risk because they have to work in weather conditions most people would avoid, and their work requirements might make it difficult to bundle up and protect themselves. Workers at highest risk are in construction, commercial fishing, and agricultural work.

The Labor Department cites these major risk factors for cold-related injury:

- wearing inadequate or wet clothing;
- taking certain drugs or medications or other substances, such as alcohol, nicotine, caffeine, and medications that inhibit the body's response to cold or impair judgment;
- having a cold or diseases such as diabetes, heart disease, or vascular and thyroid problems;
- being male, possibly because of increased risk-taking, reduced body-fat, and other physiological differences;
- becoming exhausted or immobilized, especially because of entrapment;
- being older.

These engineering controls and work practices can help protect workers:

- Use an on-site source of heat, such as air jets, radiant heaters, or contact warm plates.
- Shield work areas from drafts or wind.
- Provide a heated shelter for workers who experience prolonged exposure to wind chill temperatures of 20 degrees F or less.
- Use thermal insulating handles on equipment

handles when temperatures drop below 30 degrees F.

- Adjust to the cold before embarking on a full-work schedule.
- Allow workers to set their own space and take extra breaks if needed.
- Minimize the work performed outdoors, and schedule it for the warmest part of the day.
- Ensure that workers remain hydrated.
- Use a buddy system when working outdoors.
- Educate employees about the symptoms of cold-related stresses — heavy shivering, severe fatigue, drowsiness, or euphoria. ■

## Safety tip: Place gas cans on ground before filling

A common practice among workers actually is an extremely dangerous fire hazard, according to a special warning issued recently by safety experts.

The National Institute for Occupational Safety and Health (NIOSH) in Cincinnati reports it has received several reports of fires spontaneously igniting when workers attempt to fill portable gasoline containers in the backs of pickup trucks equipped with plastic bed liners or in cars with carpeted surfaces. Serious skin burns and other injuries resulted from the accidents.

The fires resulted from the buildup of static electricity. The insulating effect of the bed liner or carpet prevents the static charge generated by gasoline flowing into the container or other sources from grounding. The discharge of the buildup to the grounded gasoline dispenser nozzle may cause a spark and ignite the gasoline. Both ungrounded metal and plastic gas containers have been involved in the incidents, but NIOSH considers the metal containers more at risk.

To avoid the risk of fire, NIOSH suggests occupational health professionals pass on these warnings to workers:

- Always place a gas can on the ground before fueling.
- Touch the can with the gas dispenser nozzle before removing the can lid.
- Keep the gas dispenser nozzle in contact with the can inlet when filling.

NIOSH also recommends placing these warnings in prominent places at refueling sites and on any gas containers used in the workplace. ■

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