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FEATURES

Preventing Needlesticks 12

New rules affirm the need for safer devices to protect some 5.6 million workers who handle medical sharps
by Susan Hall Fleming

Safety by the Numbers 14

A new Bureau of Labor Statistics report shows a continuing downward trend in lost-time injuries and illnesses.
by Fred Walters

A New Approach to Logging 16

Efforts to promote logging safety and training in one of the country's most dangerous occupations are helping save lives.
by Donna Miles

Safety at the Showroom 23

New-car dealers in eastern New York have shifted into high gear to promote safety and health in their repair facilities
by Deborah Dorman

Reaching Out for Safety 26

OSHA's new compliance assistance specialists are working at the grassroots to promote safer, more healthful workplaces.
by Susan Hall Fleming

Beating the Heat 31

With increased awareness and some basic precautions, many heat-related injuries can be prevented.
by Donna Miles



DEPARTMENTS

- 2 Assistant Secretary's Message
- 3 Q&A
- 5 What's Happening?
- 35 OSHA Training
- 41 Toolbox

Beating the Heat

by Donna Miles

Soaring heat and humidity can be deadly to workers. But, with increased awareness and some basic precautions, many heat-related injuries can be prevented.



It was a hot, humid day in central Texas. A 46-year-old worker from a temporary labor service had been assigned to the cleanup crew for a precast concrete company. His job was to sweep up excess concrete and scrap metal, then to shovel it into the bucket of a backhoe. It was heavy labor under any conditions, but especially in scorching conditions with temperatures soaring to 100° F by mid-afternoon.

The worker complained to his coworkers that he was thirsty and not feeling well, then collapsed. His coworkers responded quickly, moving him to a shaded area and administering cardiopulmonary resuscitation until an emergency response team arrived. The worker had stopped breathing and had no heartbeat or blood pressure. His core body temperature had skyrocketed to 108° F—almost 10° above normal. Despite continued CPR and efforts to cool his body with ice packs and water, the

During hot-weather months, conditions in kitchens, bakeries, laundries, and foundries can be stifling. Photo by Wendy Johnson



Drinking a cup of cool water every 15 to 20 minutes is one of the best defenses against heat-related injuries. Photo by Donna Miles

worker was pronounced dead at the hospital.

The deadly combination of heat, humidity, and physical labor had claimed another victim.

During 1999 alone, excessive heat exposure caused 34 worker deaths and 2,420 occupational injuries and illnesses involving days away from work, according to 1999 data from the Bureau of Labor Statistics. The Occupational Safety and Health Administration reported that five of the workers died from heat-related injuries during a single 14-day period between late July and early August.

Despite these alarming statistics, state and federal agencies estimate that heat-related illnesses are vastly underrecognized and underreported.

Many workers, including those in foundries, laundries, bakeries, and restaurants, face hot working conditions year-round. During hot-weather months, these conditions

can become stifling, despite efforts to cool the areas with air conditioners, fans, or open windows.

For people who work outside, particularly those involved in heavy labor such as construction, roofing, and farming, blazing summer temperatures can be especially unforgiving.

Consider the 47-year-old airline employee who passed out while loading luggage onto a plane in Texas and died on the way to the hospital. Or the 29-year-old Virginia slaughterhouse worker who responded positively when he was treated for signs of heat stress, but later had a seizure and died. Or the 56-year-old worker who collapsed and died while sandblasting pipe at a Kansas wastewater plant. He was wearing a neoprene suit when the heat index registered between 105° and 110° F.

The Body's Response

When exposed to severe heat, the body works to maintain a fairly constant internal temperature. It increases blood flow to the skin,

Forms of Heat Stress

- Heat cramps—mild. Result from dehydration and a slight imbalance in electrolytes. Victims respond well to rest and rehydration with fluids.
- Heat exhaustion—more severe. Involves removing the person from the hot environment to a cool, shaded location and rehydrating with cool fluids. Treatment may require intravenous fluids to replace lost fluids if drinking water does not relieve the condition.
- Heat stroke—most severe. A medical emergency that requires extensive intervention and support. Occurs most often when workers perform strenuous work in hot, humid weather for an extended period.

where it releases excess heat. The body produces sweat that, when it evaporates, cools the skin.

But in extreme conditions, this process doesn't work as nature planned. When muscles are being used for physical labor, less blood is available to flow to the skin and release body heat. And sweat doesn't evaporate from the skin in high humidity. The body can't

heat-related injuries frequently occur. That was the case for a roofer who collapsed and died from heat stress his first day on the job during an unseasonably hot May day in West Virginia. After an adjustment period of 5 to 7 days, most workers are able to work with less strain and stress. However, their bodies must be reacclimated after an absence from the hot environment, such as after they take a vacation.

Prevention Saves Lives

As severe as heat-related injuries can be, Trese Louie, a health scientist in OSHA's Office of Technical Programs and Coordination Activities, says they are among the most preventable. She urges workers to drink plenty of water—from 5 to 7 ounces every 15 to 20 minutes—to replace the 2 to 3 gallons of sweat they may lose during a workday. She also encourages workers to take short but frequent breaks from their work in a cool, shady area. And whenever possible, she recommends that employers alter work hours so employees do their most demanding physical work before or after the hottest hours of the day.

Keith Piercy, a compliance safety and health officer in OSHA's Tampa, FL, Area Office, says employers at most of the worksites he inspects "do a very good job" of providing their workers plenty of water and electrolyte drinks in hot weather. He says some employers go the extra measure, offering their workers special crystal-filled scarfs that, when soaked in water and wrapped around their necks, help cool their bodies, or misting stations like those used to cool professional football players.

Yet Piercy says he notices two areas where some employers are missing the mark. Although they may encourage workers to take

How to Protect Workers

- Encourage workers to drink plenty of water—about a cup of cool water every 15 to 20 minutes, even if they are not thirsty—and to avoid alcohol, coffee, tea, and caffeinated soft drinks that dehydrate the body.
- Help workers adjust to the heat by assigning a lighter workload and longer rest periods for the first 5 to 7 days of intense heat. This process needs to start all over again when a worker returns from vacation or absence from the job.
- Encourage workers to wear lightweight, light-colored, loose-fitting clothing. Workers should change their clothes if they get completely saturated.
- Use general ventilation and spot cooling at points of high heat production. Good airflow increases evaporation and cooling of the skin.
- Train first-aid workers to recognize and treat the signs of heat stress and be sure all workers know who has been trained to provide aid. Also train supervisors to detect early signs of heat-related illness and permit workers to interrupt their work if they become extremely uncomfortable.
- Consider a worker's physical condition when determining fitness to work in hot environments. Obesity, lack of conditioning, pregnancy, and inadequate rest can increase susceptibility to heat stress.
- Alternate work and rest periods, with rest periods in a cooler area. Shorter, more frequent work-rest cycles are best. Schedule heavy work for cooler times of the day and use appropriate protective clothing.
- Monitor temperatures, humidity, and workers' responses to heat at least hourly.



People who work outside can help cool their bodies with frequent breaks in a shaded area.

release excess heat, so its core temperature rises and the heart rate increases.

As a result, the person starts to lose concentration and has difficulty focusing on tasks. Some people begin to feel sick or irritable and lose the desire for the fluids they so desperately need. Some may faint or even die if they do not receive immediate care to lower their body temperature.

Not everyone reacts equally to heat. A worker's age, weight, fitness level, and medical condition play a role. Low-sodium diets, consumption of alcohol or caffeine, and some medications increase the risk.

Acclimation is another important factor. The first days in a hot environment are generally the hardest on workers, and when

more frequent breaks in particularly hot weather, they often do not set aside a cooler or shaded area for those breaks—meaning that the workers are not able to cool themselves effectively before returning to work.

And although many of the larger companies Piercy visits take steps to teach their workers about heat-related illnesses, he says some of the smaller companies fall short on education. “What employers aren’t always good at is impressing on their employees how much caffeine and alcohol affect their ability to work in the heat,” he says, “or the benefit of wearing lighter-colored clothing that reflects heat instead of absorbing it.”

With some basic precautions, many heat-related injuries and deaths can be prevented.

Louie says worker education is key in helping prevent heat injuries at work. “Workers need to know how to avoid heat injuries and how to recognize signs of heat stress not only in themselves, but in their coworkers, too,” she says. “By looking out for each other, they can help protect each other.”

One tool to help them is OSHA’s Heat Stress Card (OSHA 3154). This laminated, fold-up card, available free to employers to distribute to their workers, provides a quick reference about heat-related injuries, including warning signs and prevention tips. Employers can order the cards through the OSHA website at www.osha.gov, which also provides additional information about heat-related injuries.

“Heat-related injuries take their toll on too many workers,” says Louie. “With increased awareness and some basic precautions, many of these illnesses and deaths can be prevented.” JSHQ

