

## HEAT-RELATED ILLNESS



CHARLES J. BRIENZA

**A**s summer draws near, heat-related illness and hazardous working conditions, such as high heat and humidity, are in the forefront of the minds of many outside construction workers. The fact of the matter is that heat-related illness can strike at any point throughout the year. Repairing concrete in a steam tunnel, boiler room, or high heat and humid conditions of an underground

hydrodemolition operation can all spell disaster for the unprepared, dehydrated worker. Under most circumstances, preparation and training are key to preventing heat-related illnesses.

Before prevention is discussed, “heat-related illness” must be defined. In 2011, the Occupational Safety and Health Administration (OSHA) launched a campaign to prevent heat-related illness in outdoor workers. In that campaign, OSHA defines heat-related illness as a condition caused by the body’s inability to cool itself when working in high heat and high humidity. They classify heat-related illnesses into two categories: Heat Exhaustion and Heat Stroke. The symptoms of heat exhaustion are dizziness, headache, sweaty skin, fast heartbeat, nausea, vomiting, weakness, and cramps. Heat stroke is characterized by red, hot, dry skin; high body temperature; confusion; fainting; or convulsions. It should be noted that not all symptoms will always appear in either condition nor is heat exhaustion the precursor to heat stroke or vice versa.

As with all hazards, it is an employer’s responsibility to identify the hazard and then train their workers to protect themselves from the hazard. Identification is simple; for outdoor workers, monitor the weather forecast. Most weather services forecast a value called “heat index.” The heat index takes into consideration both temperature and humidity to determine how hot a person feels. This is caused by a reduction in the evaporative effect of cooling encountered in high-humidity environments. The body’s chief cooling function is sweating. Sweat evaporates on the skin, causing a cooling effect. When humidity is high, perspiration can less readily evaporate into already saturated air. If your weather service does not forecast the heat index, OSHA has launched a Heat Safety Tool that calculates the heat index based on ambient conditions. This tool is an application (app) that can be installed on any Android or iPhone. The app can be found at [www.osha.gov/SLTC/heatillness/heat\\_index/heat\\_app.html](http://www.osha.gov/SLTC/heatillness/heat_index/heat_app.html).

Workers exposed to high heat and humidity should be trained to protect themselves from injury. The first step in being protected is to drink plenty of fluids such as water, fruit juice, or sports drinks. Avoid beverages that contain caffeine, such as soda, energy drinks, coffee, tea, cocoa, or alcohol. Fluid intake should begin well before the exposure to heat and humidity; it should continue throughout the work shift to help in remaining hydrated and beyond the work shift to replenish any fluids

which may have been lost during the shift. One way to determine hydration is to self-monitor urine color. A well-hydrated individual’s urine color will be clear or a very light translucent yellow. If the urine color is dark yellow or orange, it could signify dehydration, thus indicating more fluids should be taken. OSHA recommends that at least 1 cup of water be consumed every 15 minutes regardless of thirst when working in heat-stress environments.

Workers should wear light-colored, breathable clothing that covers as much skin as possible, including a hat. Although it may not be intuitive to wear long sleeves when working outdoors in the summer, shielding the skin from the sun’s damaging rays and radiant heat to which they expose a worker can be imperative. Dark-colored clothes absorb heat which is transferred to the body; light-colored clothing reflects heat away from the body.

Work shift or task modification can be a very effective tool in reducing a worker’s exposure to heat-stress conditions. It is not always possible to schedule tasks that require heavy physical exertion to be performed early morning as opposed to the middle of the afternoon; however, if this is done, heat stress placed on the body is greatly reduced.

When working outside, shade breaks are another effective method to cool workers. According to OSHA, at least 5 minutes of shade is required for the body to cool. The frequency and duration of shade breaks should be modified based on the work task and prevailing conditions. Supervisors play a key role in determining when shade breaks are necessary. In California, The Division of Occupational Safety and Health requires shade be provided when temperatures exceed 85°F (29°C) or whenever an employee requests it otherwise.

Workers should use the “buddy system,” in which no worker ever works alone and every worker is trained to know and identify the symptoms of heat-related illness. Furthermore, workers should be prepared to respond to a possible case of heat-related illness. If a worker is suspected of suffering from a heat-related illness, it is an emergency. Once an ambulance has been called, initiate first aid and move the affected individual to shade. If the person is conscious and not vomiting, give them a little water at a time. Loosen any clothing which could be constricting blood flow and thus impairing cooling. Fan the person, put ice packs in key locations such as the groin or underarms, or soak the individual’s clothing with cool water. **DO NOT IMMERSER THE VICTIM IN COLD OR ICE WATER!** This could cause a person to go into shock, another very serious and possibly deadly condition.

An acclimatization period is required for the human body to operate at peak cooling efficiency. This is especially important when introducing new workers to a “hot job” or even when hiring new workers in the middle of the summer. It applies to all workers if there is an extreme weather change. For example, the average temperature in Washington, DC, in May is 75°F (24°C) with a recorded high temperature of 99°F

(37°C). If a worker last works on a Friday, in which the high temperature is in the 70s, and the next day goes to work, perhaps Monday, and the temperature is approaching 100°F (38°C), the extreme temperature change creates a very dangerous environment for what could be a grossly unprepared worker. A study titled “Occupational Exposure to Hot Environments,” published in 1986 by The National Institute for Occupational Safety and Health, states, “heat acclimatization can usually be induced in 5 to 7 days of exposure at a hot job.” If the weather change is gradual, the acclimatization is natural. In case of extreme weather change or immediate introduction into a heat-stress environment, acclimatization should be regimented and controlled by the employer. This can be accomplished by slowly introducing the worker to the environment. For example, introduce a new worker for 2 hours their first day, 4 hours the next, 6 hours on the third day, and finally 8 hours on the fourth day.

In very extreme environments, personal protective equipment may be needed to further protect workers. Cooling vests can be worn by workers. Some cooling vests are passive and

only require periodic soaking in cold water to activate. Some vests are active and have pumps that transport coolant into chambers in the vest to cool the body.

In conclusion, heat-related illness is a serious matter that can be prevented in most cases by planning ahead and training workers in the effective management of heat-stress environments. For more information, OSHA’s website ([www.osha.gov](http://www.osha.gov)) has volumes of information on heat-related illnesses. The campaign OSHA launched to combat heat-related illness can be found at [www.osha.gov/SLTC/heatillness/index.html](http://www.osha.gov/SLTC/heatillness/index.html). This page presents educational materials, including a very informative and well-designed training guide. Furthermore, ICRI has recently published a White Paper titled “Heat Illness Awareness and Prevention.” This document is a free download on ICRI’s website ([www.icri.org](http://www.icri.org)), under Publications.

---

*Charles J. Brienza, CHST, is a Safety Director with Concrete Protection and Restoration, Inc.*