Safeguarding Against Heat Hazards

Heat stress is preventable. Supervisors/Managers must understand it and use measures such as indoor or spot cooling, rest periods, thirst quenchers, and protective clothing.

by Fred Elliott

Heat stress occurs when the body cannot release heat and cool itself. When the air temperature is as warm as or warmer than a person's skin, blood brought to the skin's surface cannot efficiently release heat. Working hard in high heat impedes the body's ability to cool itself because the muscles need extra blood, thus decreasing the amount of blood available to circulate to the skin and internal organs. Alertness, stamina, and productivity suffer; the body's core temperature and heart rate rise.

How much heat a person can tolerate without harm depends on his or her level of acclimatization. But there is a point at which any worker's body cannot cope, and then the worker has a significantly higher risk of becoming a heat casualty.

The body's inability to release excess heat can cause several ailments.

* *Heat stroke* is the most serious health problem facing workers. Sweating stops; the person become confused, delirious, and then loses consciousness. This individual will have a body temperature of 106 degrees F or higher and hot, dry skin that may be red, mottled, or bluish. Victims will die without prompt treatment. Move him to a cool area and soak his clothes with cool water, fanning vigorously to increase cooling.

* *Heat exhaustion* results from loss of fluid through sweating when the worker has not drunk enough fluids, taken in enough salt, or both. He still sweats but experiences extreme weakness, giddiness, nausea, or headache. The skin is clammy and moist, and body temperature is normal or slightly higher. He should rest in a cool place and drink an electrolyte solution to restore potassium, calcium, and magnesium salts quickly.

* *Heat cramps* are muscle spasms caused when workers drink lots of water but do not replace their bodies' salt loss. Tired muscles usually are the most likely to cramp; this may occur at work or afterward.

* *Heat syncope* (fainting) can affect a worker who has not become acclimatized to a hot environment. Victims usually recover quickly after lying down for a short time.

* *Heat rash*, also known as prickly heat, can occur in hot, humid environments where sweat is not easily removed from the surface of the skin by evaporation. This can be prevented by having the worker rest in a cool place.

Older workers find it increasingly difficult to endure heat, experts in this area say. Heavy or impermeable clothing, and some types of chemical protective clothing, also can tax the body's cooling system to or beyond its limits.

Because certain medicines and medical conditions can raise susceptibility to heat stress, managers should know the medical history and health status of their workers. For the same reason, employees who may be exposed to high-heat environments should be instructed to alert their managers when personal conditions or medications change.

NIOSH's 1986 Recommendations
The criteria and recommendations are still available online at www.cdc.gov/niosh/topics/heatstress.

If enacted as recommended, the standard: would have established separate Recommended Exposure Limits for acclimatized and non-acclimatized workers and a heat ceiling above which no worker should have been exposed without using heat-protective clothing and equipment; would have required Wet Bulb Globe Temperature or equivalent methods for measuring environmental heat exposures; would have directed employers to conduct medical surveillance on workers who were or might be exposed to heat stress above a Recommended Alert Limit; and would have required appropriate emergency medical treatment if a worker developed signs or symptoms of heat illness.

The standard also would have required warning signs in work areas and at entrances where there was a reasonable likelihood of heat exceeding the ceiling limit. These words of warning were recommended:

Dangerous Heat-Stress Area
Heat-stress protective clothing or equipment required
Harmful if excessive heat exposure or work load occur
Heat-induced fainting, heat exhaustion, heat cramp, heat rash or heat stroke may occur

Protective clothing and equipment, training and continuing education, engineering controls, and recordkeeping were specified in the recommendations. The document remains highly useful today.

"This recommended standard should prevent or greatly reduce the risk of adverse health effects to exposed workers," the agency said in the preface. "Heat-induced occupational illnesses, injuries, and reduced productivity occur in situations in which the total heat load (environmental plus metabolic) exceeds the capacities of the body to maintain normal body functions without excessive strain. The reduction of adverse health effects can be accomplished by the proper application of engineering and work practice controls, worker training and acclimatization, measurements and assessment of heat stress, medical supervision, and proper use of heat-protective clothing and equipment."

Good Practices to Avoid Illness
These practices can help workers avoid heat illnesses:

* When working in hot environments, have workers drink plenty of fluids every day. They should drink water even if they aren't thirsty. Drinking plenty of water on “at least” an hourly basis is highly recommended while working in hot/humid environments.

* Physical fitness is important because staying physically fit can increase an individual's tolerance for heat.

* Schedule frequent breaks in rest areas with a temperature of about 75 degrees F.

* Acclimatize the workers to the environment. This can take as long as three weeks.

* Perform the most strenuous work on cooler days or during cooler times of the day.

* Have the employees wear clothing that offers protection.

* Train/educate them to recognize the signs and symptoms of heat stress.

Protective Products

Cooling devices, including cooling vests and air-circulating fans, can be useful. Several types of cooling technology are available in garments to be worn on the job. Circulating solutions involve tubes sewn into a garment for fluids to pass through, while passive solutions employ refrigeration or systems that hold ice packs.

Also available are materials that are sewn or incorporated into garments and absorb a wearer's body heat, making him or her cooler on the job.

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