

Heat Stress 101

With the recent stretch of warm weather we are reminded about heat waves, the reality is that they're just around the corner and can pop up in just a few days. Although most folks know when they feel hot and uncomfortable, many do not recognize or understand the symptoms of heat stress and to what levels it can go, up to and including death. Please take a few minutes to read through the information I have included in this article. What you learn can make a big difference both at work and at home. After all, we all want to get safely home to our family and friends and enjoy the quality of life that we deserve.

There are many types of heat disorders, each one having their own effect on your health. The most important thing is to understand each one and to heed the recommendations that follow.

HEAT FATIGUE. A factor that predisposes an individual to heat fatigue is lack of acclimatization or getting used to the heat (it usually takes about three weeks). The use of a program of acclimatization and training for work in hot environments is advisable. The signs and symptoms of heat fatigue include impaired performance of skilled sensorimotor, mental, or vigilance jobs. There is no treatment for heat fatigue except to remove the heat stress before a more serious heat-related condition develops.

HEAT RASHES are the most common problem in hot work environments. Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

HEAT COLLAPSE ("Fainting"). In heat collapse, the brain does not receive enough oxygen because blood pools in the extremities. As a result, the exposed individual may lose consciousness. This reaction is similar to that of heat exhaustion and does not affect the body's heat balance. However, the onset of heat collapse is rapid and unpredictable. To prevent heat collapse, the worker should gradually become acclimatized to the hot environment.

HEAT CRAMPS. Are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused by both too much and too little salt. Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution ($\pm 0.3\%$ NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments. Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Recent studies have shown that drinking commercially available carbohydrate-electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

HEAT EXHAUSTION. The signs and symptoms of heat exhaustion are headache, nausea, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment. Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, a medical emergency. Workers suffering from heat exhaustion should be removed from the hot environment and given fluid replacement. They should also be encouraged to get adequate rest.

HEAT STROKE occurs when the body's system of temperature regulation fails and body temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 41°C (105.8°F). If body temperature is too high, it causes death. The elevated metabolic temperatures caused by a combination of workload and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.

If a worker shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The worker should be placed in a shady area and the outer clothing should be removed. The worker's skin should be wetted and air movement around the worker should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment.

Regardless of the worker's protests, no employee suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

At Sikorsky, the Union and the company have been using heat stress formulas and recommendations from the American Conference of Governmental Industrial Hygienists (ACGIH). The formula, $WBGT = 0.7NWB + 0.3GT$, takes into consideration the NWB (Natural Wet-Bulb Temperature) and the GT (Globe Temperature) when calculating WBGT (Wet Bulb Globe Temperature Index). To explain in more detail, the NWB measures the temperature based on the humidity levels, thus the reason why this value weighs so heavily in the formula (70%). The GT measures the temperature based on the effect that air movement has on it. In English, humidity drives the index more than just temperature and air movement helps decrease GT readings.

Once levels of caution are reached, appropriate breaks are recommended in 15 - minute increments per hour. In addition, the ACGIH recommends the following:

- Reduce the physical demands of work, e.g., excessive lifting or digging with heavy objects;
- Provide recovery areas, e.g., air-conditioned enclosures and rooms;
- Use shifts, e.g., early morning, cool part of the day, or night work;
- Use intermittent rest periods with water breaks;
- Use relief workers;
- Use worker pacing; and
- Assign extra workers and limit worker occupancy, or the number of workers present especially in confined or enclosed spaces.

Above all, awareness and education are vital to prevent heat stress. Training is the key to good work practices and a good heat stress program should include at least the following components:

- Knowledge of the hazards of heat stress;
- Recognition of predisposing factors, danger signs, and symptoms;
- Awareness of first-aid procedures for, and the potential health effects of, heat stroke;
- Employee responsibilities in avoiding heat stress;
- Dangers of using drugs, including therapeutic ones, and alcohol in hot work environments;
- Use of protective clothing and equipment; and
- Purpose and coverage of environmental and medical surveillance programs and the advantages of worker participation in such programs.

In conclusion, your Union EH&S Stewards and I closely monitor conditions in the shop and take appropriate actions to safeguard you, the members of Teamsters Local 1150. However, I cannot stress enough the importance of understanding your own body. Each one of you is unique and has their own physiological structure; only you know what your body needs. I would ask that if you experience any symptoms of heat stress as described in this article, don't wait, report to medical and protect yourself. Stay cool, healthy and safe.

Respectfully,

Joe Grabinski – Union Chief EH&S Steward