

# SAFETY TALK

## HEAT EXHAUSTION

Over-exertion comes in several ways. Heavy lifting, stretching, straining and disregard for proper and good health habits are a few.

In July when the days are long and hot, we should be thinking of measures to be taken to protect ourselves from being exposed to excessive heat while working.

Recognizing the first symptom of heat exhaustion is important, so proper first aid measures can be taken. The first signs are usually weakness, dizziness, nausea and staggering. Frequently, the person vomits freely, the face is pale, and he will sweat profusely. Pulse is usually weak and breathing is shallow. The person may be unconscious or may faint able to lie down. Usually this faintness soon passes, but in severe cases, it remains and death may follow.

A person who shows these symptoms of heat exhaustion should be removed immediately to a place where the air is circulating freely, then should be treated for shock by doing the following:

- » Lie down.
- » Keep comfortably warm.
- » Administer stimulants such as warm coffee or tea.
- » Give table salt at the rate of one-half teaspoonful (one-half teaspoonful should be given six times). There is little danger that a person will become nauseated from salt and water when suffering from heat exhaustion. It may be easier to give salt water instead of granulated salt. In this case, a teaspoonful of salt should be added to a pint of water and small drinks of salt water should be taken at frequent intervals.

If the heat exhaustion symptoms do not pass away readily, a doctor should be called. The dangers from heat exhaustion are not nearly so great as the dangers from sunstroke or heat stroke. Immediate first aid must be given whenever a person is overcome by the heat. Careful attention to first aid measures will result in rapid recovery without permanent effects. Finally, always keep in mind that the symptoms of heat exhaustion are different from the symptoms of sunstroke or heat stroke and that the first aid treatments to be applied are correspondingly different.

## PROTECTING WORKERS IN HOT ENVIRONMENTS

Many workers spend some part of their working day in a hot environment. Workers on construction projects often face hot conditions that pose special hazards to safety and health.

## Heat Stress Causes Body Reactions

Four environmental factors - temperature, humidity, radiant heat (such as from the sun) and air velocity - affect the amount of stress a worker faces in a hot work area. Perhaps most important to the level of stress an individual faces are personal characteristics such as age, weight, fitness, medical condition and acclimatization to the heat.

The body reacts to high external temperature by circulating blood to the skin, which increases skin temperature and allows the body to give off its excess heat through the skin. However, if the muscles are being used for physical labor, less blood is available to flow to the skin and release the heat.

Sweating is another means the body uses to maintain a stable internal body temperature in the face of heat. However, sweating is effective only if the humidity level is low enough to permit evaporation and if the fluids and salts lost are adequately replaced.

Of course, there are many steps a person might choose to take to reduce the risk of heat stress such as moving to a cooler place, reducing the work pace or load or removing or loosening some clothing.

If the body cannot dispose of excess heat, it will store it. When this happens, the body's core temperature rises and the heart rate increases. As the body continues to store heat, the individual begins to lose concentration and has difficulty focusing on a task, may become irritable or sick and often loses the desire to drink. The next stage is most often fainting and then possible death if the person is not removed from the hot environment.

## Heat Disorders:

**Heat stroke**, the most serious health problem for workers in hot environments, is caused by the failure of the body's internal mechanism to regulate its core temperature. Sweating stops and the body can no longer rid itself of excess heat. Signs include (1) mental confusion, delirium, loss of consciousness, convulsions or coma; (2) a body temperature of 106°F or higher; and (3) hot dry skin which may be red, mottled or bluish. Victims of heat stroke will die unless treated promptly. While medical help should be called, the victim must be removed immediately to a cool area and his or her clothing soaked with cool water. He or she should be fanned vigorously to increase cooling. Prompt first aid can prevent permanent injury to the brain and other vital organs.

**Heat exhaustion** develops as a result of loss of fluid through sweating when a worker has failed to drink enough fluids or take in enough salt or both. The worker with heat exhaustion still sweats, but experiences extreme weakness or fatigue, giddiness, nausea or headache. The skin is clammy and moist, the complexion pale or flushed, and the body temperature normal or slightly higher. Treatment is usually simple. The victim should rest in a cool place and drink salted liquids. Severe cases involving

victims who vomit or lose consciousness may require longer treatment under medical supervision.

**Heat cramps**, painful spasms of the bone muscles, are caused when workers drink large quantities of water but fail to replace their body's salt loss. Tired muscles - those used for performing the work - are usually the ones most susceptible to cramps. Cramps may occur during or after working hours and may be relieved by taking salted liquids by mouth or saline solutions intravenously for quicker relief, if medically determined to be required.

**Fainting** may be a problem for the worker not acclimated to a hot environment who simply stands still in the heat. Victims usually recover quickly after a brief period of lying down. Moving around, rather than standing still, will usually reduce the possibility of fainting.

Heat rash, also known as prickly heat, may occur in hot and humid environments where sweat is not easily removed from the surface of the skin by evaporation. When extensive or complicated by infection, heat rash can be so uncomfortable that it inhibits sleep and impairs a worker's performance or even results in temporary total disability. It can be prevented by resting in a cool place and allowing the skin to dry.

## Preventing Heat Stress

Most heat-related health problems can be prevented or the risk of developing them reduced. Following a few basic precautions should lessen heat stress:

- » Acclimation to the heat through short exposures followed by longer periods of work in the hot environment can reduce heat stress. New employees and workers returning from an absence of two weeks or more should have a 5 day period at acclimation. This period should begin with 50 percent of the normal workload and normal work time the first day and gradually build up to 100% on the fifth day.
- » A variety of engineering controls including general ventilation and spot cooling by local exhaust ventilation at points of high heat production may be helpful. Shielding is required as protection from radiant heat resources. Evaporative cooling and mechanical refrigeration are other ways to reduce heat. Cooling fans can also reduce heat in hot conditions. Eliminating steam leaks will also help. Equipment modifications, the use of power tools to reduce manual labor and using personal cooling devices or protective clothing are other ways to reduce heat exposure for workers.
- » Work practices such as providing a period of acclimation for new workers and those returning after two-week absences and making plenty of drinking water - as much as a quart per worker per hour - available at the workplace can help reduce the risk of heat disorders. Training first aid workers to recognize and treat heat stress is essential. Employers should also consider individual workers' physical

conditions when determining their fitness for working in hot environments. Older workers, obese workers and personnel on some types of medication are at greater risk.

- » Alternating work and rest periods with longer rest periods in a cool area can help workers avoid heat stress. If possible, heavy work should be scheduled during the cooler parts of the day and appropriate protective clothing provided. Supervisors should be trained to detect when their workers are showing signs of heat stress.
- » Employee education is vital so that workers are aware of the need to replace fluids and salt lost through sweat and can recognize dehydration, exhaustion, fainting, heat cramps, salt deficiency, heat exhaustion and heat stroke as heat disorders. Workers should also be informed of the importance of daily weighing before and after work to avoid dehydration.

## HEAT AFFECTS PRODUCTIVITY

Heat is often the topic of conversation in the summer months. There's an old saying that everyone talks about the weather, but no one does anything about it. Heat is one form of weather that managers must do something about. The effects of failure to act can be quite grim.

One effect is on productivity. Studies show that people work up to certain levels of muscular strain. A person is 100% efficient at temperatures from 80°F for medium work to 77°F for heavy work. If the temperature is increased to 89°F, efficiency drops to 70%. Increase to 91.5°F and efficiency drops to 50%. Further increases cause drops to 30% at 94°F and 20% at 95°F.

People live close to the borders of thermal death. Normal body temperature is 98.6°F. Death is expected at 106°F or 91°F - a very narrow margin. Body mechanisms to generate, store, and dump heat enable people to live and work in hotter or colder climates. But, management of body fluids and salt is also needed. These temperatures are for healthy, physically conditioned young workers. Aerobic fitness, obesity, age, body composition and air flow modify the temperatures as follows:

- » Not physically fit: - 4°F
- » Wearing impermeable clothing: - 9°F
- » Obese (20 lbs. over optimum weight): - 2°F
- » Elderly (over 60): - 2°F
- » Female body composition: - 2°F
- » Adequate ventilation air flow: +4°F

Heat stress, unchecked, can result in various degrees of illness from transit heat fatigue up through heat rash, heat cramps, heat exhaustion, and heat dehydration, to

heat stroke. Many of the necessities for heat stress control need to be provided through program management. These include selection and placement, acclimation, electrolyte drinks (not salt tablets), ventilation, and rest in cooler areas. Others need to be done by the employee. These are maintaining physical condition, limiting consumption of diuretics (like alcohol, coffee, tea, and many drugs) and proper personal clothing. It's a cooperative effort. Together, managers and employees can do something about the heat.

## SUNSTROKE

Did you ever come close to passing out because of heat? If you've ever had this experience or have seen another person in this condition, you can appreciate the seriousness of sunstroke. What happens to a person who is exposed to excessive heat from the sun's rays? First he will complain of a severe headache, his face will be red, his skin hot and dry. They will not be sweating- the pulse will be strong and rapid and his temperature will go to 106°F or above. He usually becomes unconscious if the case is at all severe.

No two people have the same physical resistance to heat. An added factor is that, while working, some workers wear heavy or tight-fitting clothing. This is the kind of clothing not to wear on hot days.

The American Red Cross First Aid Textbook says about sunstroke: "The cause is direct exposure to the sun rays. The first-aid treatment is to get the victim into the shade and remove the clothing. Lay the patient on his back with head and shoulders somewhat elevated. Apply cold to the head wet cloths, ice bags, ice and cool the body. Give NO stimulants. If the patient is taken to the hospital in an ambulance, treatment should be continued during transportation."

When temperatures outside rise to 95°F or above, our bodies can no longer be cooled by the outside air. The higher the outside temperature, the greater the danger from sunstroke. In fact, too much exposure to the sun can be as dangerous as too much exposure to toxic gases, not to mention the painful effects of sunburn. The reason for emphasizing this danger is that about 25% of the very severe cases of sunstroke die.

Most of us, wanting to get done as quickly as possible, sometimes neglect certain precautions. The thing to do in hot weather is to use common sense. Keep out of the direct rays of the sun as much as possible, wear head covering, dress in light clothing, take a salt solution to replace the body salt loss in sweating and avoid alcoholic beverages. Following these precautions in hot weather will save you a lot of grief.

