

HEAT STRESS IN INDUSTRIAL ENVIRONMENTS

COURSE OUTLINE

- **It's not unusual for us to get hot and sweaty on the job.**
 - Sometimes it's because of the weather.
 - Sometimes it's the physical tasks we perform...
 - ...Or even the nature of the facility we work in.
- **Being overheated is not only uncomfortable, but it makes any job more difficult.**
 - And most importantly, it can affect our health as well.
- **Fortunately, our body has physical processes that kick in automatically to help us keep cool.**
 - For example, our blood can actually help to lower our body temperature.
- **As our temperature rises, the circulatory system directs more blood to the surface of our skin.**
 - There the blood gives up the excess heat it has absorbed into the air.
 - It then circulates back inside the body to pick up more heat.
 - As this process continues, the heat is "pumped" out of our body.
- **When more cooling power is needed, our sweat glands go to work.**
 - They move heat out of the body in the form of warm water.
 - The evaporation of the sweat cools our skin off as well.
- **It's an effective system, but it does have a downside.**
 - Sweating depletes our body's supply of water and vital minerals known as electrolytes.
 - Running low on these substances can cause our body to malfunction.
- **In extreme conditions, we can sweat out up to one quart of water and electrolytes an hour.**
 - This makes us thirsty, but we can't rely on our natural thirst alone to get us to drink enough to rehydrate ourselves.
 - In these cases, we need to make a conscious effort to take in even more liquids.

- **So you should try to drink five to seven ounces of liquid every fifteen or twenty minutes when you're sweating.**
 - “Sports” or “electrolyte” drinks can be a good option, because they’re formulated to replace the minerals that you're sweating out as well.
 - But you should avoid drinks that contain alcohol or caffeine. They will only accelerate your loss of water.
- **Some medicines can do the same thing, or have other adverse effects when you’re overheated.**
 - So you need to ask your doctor if any medication that you take could cause problems when you're working in hot conditions.
- **You need to watch what you eat in the heat as well.**
 - Hot meals raise your internal temperature.
 - “Heavy” foods require more blood to be used for digestion, when that blood could be helping to cool you off instead.
 - So stick to light, cool meals when you are working in the heat.
- **Whenever we work or play in the heat, our bodies’ natural cooling processes work hard to keep us from becoming overheated.**
 - The greater the heat, the harder those processes have to work to cool us off... and the more likely they are to get “out of whack”.
- **When these natural cooling defenses break down, we can develop “heat-related illnesses” including...**
 - Heat syncope
 - Heat cramps
 - Heat exhaustion
 - Heat stroke
- **For example, sometimes when our system tries to cool itself off by directing more blood to the skin, the other parts of our body can get too little blood.**
 - This can cause a loss of consciousness or “fainting”, a condition called heat syncope.
- **Heat syncope often occurs in people who are new to working in high-heat conditions, and can lead to serious injuries if the victim falls or they lose control of a tool or vehicle when they faint.**
 - “Warning signs” include dizziness and a rapid heartbeat.

- **When we sweat a lot and fail to replace the vital minerals or "electrolytes" that we're losing we can also develop another heat-related illness, known as heat cramps.**
 - Symptoms of heat cramps include painful cramping as well as involuntary jerking or spasming of the muscles, often in the calf, thigh and shoulder.
- **When our body runs low on both electrolytes and fluids, the result can be an illness called heat exhaustion.**
 - In addition to intense thirst, someone who is suffering from heat exhaustion can feel confused, dizzy, weak and uncoordinated.
 - They will also sweat profusely.
- **The most severe heat-related illness, heat stroke occurs when the body's cooling mechanisms break down completely.**
 - As a result, the victim is unable to sweat.
 - Their skin will be flushed, very hot and dry.
 - Other symptoms of heat stroke include a throbbing headache, rapid heartbeat, nausea and vomiting.
 - Heat stroke causes a person's body temperature to rise uncontrollably, which is extremely dangerous.
 - This can cause damage to internal organs, including the brain, and can even be fatal.
- **When you're experiencing any type of heat stress, it's important to pay attention to what your body tells you.**
 - If you ignore the symptoms of one heat-related illness, such as heat cramps, it can quickly develop into another one such as heat exhaustion or heat stroke, which can be a lot more serious.
- **Even when we do our best to protect ourselves from the heat, it's still possible that working in hot conditions can "knock us for a loop".**
 - When that happens, it's important to know how to treat heat-related illnesses, because they can be serious, even life-threatening.
- **When we get overheated, our system uses the sweating process in order to carry heat out of the body in the form of warm water.**
 - However at the same time, sweating constantly depletes our reserves of water and vital minerals (electrolytes).
 - If we don't make a point of replacing these substances, the lack of them can cause us to develop heat-related illnesses.

- **When someone develops a heat-related illness on the job, you need to address the causes directly by...**
 - Getting the victim out of the heat and into a cool environment.
 - Having them sit or lie down and rest.
 - Cooling them off by bathing their head face and neck with cool water, or by applying wet towels or sheets.
 - Giving them cool water or an electrolyte beverage to drink.
- **If possible, move the victim into a shady, air-conditioned area. Remove any outerwear they have on and loosen any tight garments.**
 - If you think they may be experiencing heat stroke, call for emergency medical assistance immediately!
- **With heat stroke, it's also critical to lower their body temperature as soon as possible. You can speed up the cooling process by...**
 - Applying cold compresses to their armpits and groin.
 - Wetting down their clothing.
 - Directing a fan on them.
 - Placing them in a cool bath.
 - Using ice or cold packs.
- **You should stay with the victim and continue to cool them down until the EMTs arrive.**
- **There are times that we can't control how hot our work environment is.**
 - But there are things that we can do to help handle the heat... by preparing for it ahead of time.
 - This can not only enable you to work more comfortably, it can also help you avoid the hazards associated with heat-related illnesses.
- **For example, whenever possible you should take a gradual approach to working in a high heat environment.**
 - This gives your body time to get used to the temperature.
 - The average worker can need from 5 to 10 days to get fully acclimated, particularly in environments that are extremely hot.
- **People who are in good physical condition can generally get used to high heat conditions more quickly.**
 - They can also perform better in the heat, because their body and its muscles are lean and toned.

- **Choosing the right work clothes is another thing that can be important to staying cool.**
 - Loose, lightweight clothing made of cotton or a cotton blend helps you to get rid of excess heat by allowing the air to circulate freely around you and wick away much of your sweat.
- **The color of the clothing that you wear makes a difference, too, especially if you are working in the sun.**
 - Black or other dark colors actually absorb heat, so you should avoid wearing them.
 - Wear white and other light colors instead. They help to keep you cooler by reflecting the heat.
 - The same principle applies when you wear a hat to keep the hot sun off your head. You really want it to be light-colored as well.
- **Don't forget to apply sunscreen.**
 - It not only prevents sunburn, it helps to keep the sunshine from heating up your skin as well.
- **Remember to wear sunglasses too!**
 - Keeping the sun off your face and out of your eyes both protects you and helps you to feel cooler.
- **If your work takes you into areas with intense levels of radiant heat, your employer may provide you with special protective clothing, such as reflective garments made of aluminized fabric.**
- **Another option is ice vests, which are often used by firefighters and other workers who are exposed to very high heat.**
 - Your supervisor can tell you what type of protective clothing is best for keeping you cool and safe in your job.
- **If you're working indoors, temperatures can sometimes be reduced to safe levels through the use of cooling equipment.**
 - These solutions are called engineering controls.
- **Some of them, such as air conditioning and ventilation systems, can be built directly into a facility.**
 - Air conditioning can also be installed “locally” in windows, or as freestanding units.

- **Other engineering controls that can be built into a work environment include...**
 - Cooling systems that are attached directly to the machinery that gets hot
 - Reflective barriers that contain radiant heat given off by equipment or work processes.
- **Portable fans, such as oscillating and box type fans, are also a popular and convenient way to keep cool.**
 - Of course, making sure the fan moves the air in the right direction is important in controlling the heat.
 - When you are working near a piece of equipment that produces heat, you should position the fan to blow the hot air away from your body.
 - If there's a source of cooler air nearby, use the fan to blow it toward you.
- **Depending on the time of year, you may be able to use a fan to blow cool air into your work area from outside... or blow the hot air out.**
 - But if you're using a portable fan, it's important to remember that HVAC systems and other built-in engineering controls are carefully adjusted to cool a workplace effectively and efficiently.
 - So using a fan in your own work area may interfere with the way the HVAC system is supposed to work.
- **Turning on a fan may help to cool you off, but it can actually make things hotter for others in the facility.**
 - So be sure to talk to your supervisor about what you can and can't do to cool off your work area.

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- **Too much heat can create a number of problems for our bodies.**
- **Take the time to get used to working in higher temperatures... do it gradually.**
- **When it's hot, drink water and sports drinks regularly to replenish your fluids and electrolytes, and eat only light, cool meals during the work day.**
- **Dress in light colored cotton or cotton-blend clothing... and wear a light-colored hat if you need protection from the sun.**
- **Use engineering controls to help you stay cool whenever possible.**
- **Know how to recognize heat-related illnesses, as well as what to do if you or a coworker develops one.**
- **Now that you understand the hazards that heat can create, and know how to deal with them, you can help to make sure that you and your coworkers stay cool and healthy on the job... every day!**