

# HAZWOPER VIDEO SERIES

## TITLE: 2408 HEAT STRESS

LENGTH: 21 MINUTES

PRODUCTION YEAR: 2001

### BACKGROUND:

Hazardous materials and waste are a part of many work situations, and can be found in many types of facilities and job sites. It is very important for employees to know how to recognize these potentially dangerous substances, and how to handle and dispose of them properly. In 1976, The U.S. Environmental Protection Agency (EPA) issued the Resource Conservation and Recovery Act (RCRA) to regulate the handling of hazardous waste "from cradle to grave". Since then, other regulations have followed, including the Occupational Safety and Health Administration's (OSHA) Interim Final Rule for Hazardous Waste Operations and Emergency Response ("HAZWOPER"), which in 1986 gave OSHA the task of protecting HAZMAT workers.

As part of these HAZWOPER regulations, there are varying requirements for employee training, depending on the employee's specific level of involvement with hazardous materials. This program will help employees to understand how protecting against Heat Stress is critical to working safely around hazardous materials.

### PROGRAM OBJECTIVES: Upon completion of the program, employees should:

- Know how the body reacts to heat.
- Understand the difference between Heat Stress, Heat Exhaustion and Heat Stroke.
- Be able to recognize the symptoms of heat-related illnesses.
- Know what steps can be taken to prevent Heat Stress.
- Understand what types of basic first aid can be helpful when dealing with fellow employees who experience heat-related illnesses.

### PROGRAM OUTLINE:

#### INTRODUCTION

- **The date was March 6th, 1990. On that day, the Occupational Safety and Health Administration (OSHA) put a new regulation into effect.**
  - They wanted to prevent accidents involving hazardous materials from injuring even one more worker.
- **The Regulation applied to:**
  - Hazardous waste sites.
  - Treatment, storage and disposal facilities.
  - Emergency response operations.
- **The range of topics covered by the regulation includes:**
  - Accidental release measures.
  - Monitoring equipment.
  - Exposure controls.
  - Respiratory protection.
  - Decontamination procedures.
  - Medical surveillance.
- **It was the most comprehensive standard of its kind ever written.**
- **OSHA named the regulation "Hazardous Waste Operations and Emergency Response."**
  - Most of us simply call it HAZWOPER.
- **When you are working with hazardous materials, Personal Protective Equipment (PPE) can be a double-edged sword.**
  - On the one hand, you couldn't even approach some of these materials safely without wearing PPE.

#### HOW CLOTHING & PPE CONTRIBUTE TO HEAT STRESS

- **Chemical-Protective Clothing (CPC), for instance, defends your skin against:**
  - Rashes.
  - Burns.
  - The absorption of toxins.
- **Respiratory gear, such as Self-Contained Breathing Apparatuses (SCBAs), guards your airway from gases and vapors.**
- **But with all of the protection that PPE provides, it can also cause problems. This is usually due to two factors:**
  - The weight of PPE.
  - The fact that it can often block air from reaching your skin.
- **An SCBA, for example, can weigh over 30 pounds and fully-encapsulating CPC adds 30 more pounds to the load.**
  - Carrying all of that extra weight around will make anyone work up a sweat.
- **This is bad enough under normal conditions, but when your skin is sealed off from the outside air, your sweat cannot evaporate... and you won't be able to cool off.**
  - Under these conditions, your body may overheat, which can cause serious problems... even threaten your life.
  - This is called Heat Stress.
- **To help us guard against Heat Stress, we need to take a close look at:**
  - How it occurs.
  - What its symptoms are.
  - How to beat it.

#### HOW THE BODY REACTS TO HEAT

- **We'll begin by examining how your body's cooling system works under normal conditions.**
  - Most of the time, your body has no problem keeping itself at or near its standard temperature of 98.6 degrees Fahrenheit (37 degrees Celsius).
- **It does this in two ways. The first involves your blood.**
  - Whenever you start to get hot, your body circulates more blood to the outer layers of your skin, where it's easier for the blood to release heat.
  - This is why your skin sometimes feels flushed when you are in a hot place.
  - In essence, your blood works just like the radiator fluid in your car. It comes out of the engine hot, gets cooled, and then returns.

- **If blood circulation can't handle the whole job, your body uses a second method to cool you down.**
  - It is at this point that the sweat glands beneath your skin start to secrete water through your pores.
  - After a while, the sweat evaporates, lowering your body temperature and making you feel more comfortable.
- **But maintaining your temperature this way can also drain your body's resources.**
  - In addition to the fluids that you lose when you sweat, you also lose valuable minerals that help your body to function properly.
  - If they become too depleted, you can develop rashes, nausea or a high fever.
  - You might pass out or even die.

#### THE USE OF FLUIDS & MINERALS

- **To understand the roles that fluids and minerals play in keeping you going, let's take a detailed look at how your body uses them.**
  - When you sweat a lot, your body can lose up to one quart of fluid an hour.
  - Over an eight-hour day, this adds up to two gallons.
  - If you don't replace this fluid you could end up with a serious case of dehydration.
- **So it's important to replenish what your body sweats away.**
  - Most people drink between five and eight glasses of water a day.
  - In areas of high heat, however, this amount of water won't be nearly enough to protect you from dehydration.
- **This is even more critical if you are at a site that requires the use of totally-encapsulating CPC because you'll get hot even more quickly than you would under normal conditions.**
  - You won't be able to drink anything while you're doing a job that requires you to wear a respirator or Chemical-Protective Clothing.
  - You can't drink and wear a respirator at the same time.
  - Also, there is simply no place to carry a drink inside of your Chemical-Protective Suit.
- **In these situations, taking a short break every 15 to 20 minutes or so to drink approximately seven ounces of liquid will help you to prevent dehydration.**
  - It will also let you rest and cool down a bit.
- **In addition to the liquid you need to replace, it's also important to replenish the minerals that you sweat away during the day.**
  - These include the electrolytes, such as potassium and phosphate, that your muscles use while they work.
  - When these minerals are depleted, even simple movements can become difficult and painful.
  - Your employer will provide you with beverages whenever you return from decontamination, to restore the fluids and minerals you've lost.

#### HEAT-RELATED ILLNESSES

- **We've discussed how your body keeps its temperature under control and learned how dehydration occurs. But what happens when your body's defenses are no longer able to cool you off?**
  - This can result in a condition called Heat Stress.
  - This takes many forms, ranging from the mildly painful to life-threatening.
- **Let's look at the different types of Heat Stress, starting with the least dangerous.**
- **Heat Rash, commonly known as Prickly Heat, is an inflammation of the sweat glands... which can occur when they are overworked. Symptoms of Heat Rash include:**
  - Redness of the skin.
  - Prickling or burning sensations.
  - Small blisters (also known as blebs).
- **Although it can be painful, there is no long-term danger to Heat Rash.**
  - In fact, Heat Rash serves as a warning sign that worse forms of Heat Stress might be on their way.
  - If you develop Heat Rash, you should stop what you are doing and seek medical help as soon as possible.
- **If you ignore Heat Rash, and do nothing to treat it, you might develop Heat Cramps.**
  - Heat Cramps are painful spasms in your arms, legs and abdomen.
  - They usually occur when you sweat a lot, but don't replace the minerals that you lose.
  - Heat Cramps affect your muscles, but usually don't strike until you've taken a break, or have stopped working for the day.
- **To prevent Heat Cramps, drink electrolyte-replacing beverages throughout your work shift.**
  - This will quench your thirst, and replace the minerals that you've lost.
- **Whatever you do, don't ignore Heat Cramps.**
  - They are a strong indicator that you are on your way to developing even more dangerous forms of Heat Stress.
- **For instance, Heat Cramps often precede Heat Exhaustion, which can cause:**
  - Extreme thirst.
  - Dehydration.
  - Fatigue.
  - Weakness.
  - Loss of coordination.
  - Hyperventilation.
  - Anger.
  - Anxiety.
  - Impaired judgment.
- **As with Heat Cramps, you can prevent Heat Exhaustion by drinking electrolyte-replacing fluids throughout the work day.**
  - If you do find yourself suffering from Heat Exhaustion, stop working and see a doctor immediately!
  - Then follow the doctor's advice as to what activities you can perform at work and at home, and when you can return to your full duties.
- **Anyone who disregards Heat Rash, Heat Cramps or Heat Exhaustion runs a high risk of developing a life-threatening type of Heat Stress... Heat Stroke.**
  - This occurs when your body is no longer capable of cooling itself in any way.
  - If you experience Heat Stroke, your temperature could rise so high that brain damage or even death could result unless you receive immediate first aid.
- **Symptoms of Heat Stroke include:**
  - Dizziness.
  - Nausea.
  - Severe headache.
  - Hot, dry skin.
  - Abnormally small pupils.
  - A body temperature of 106 degrees Fahrenheit (41 degrees Celsius) or above.

## HEAT STRESS VICTIMS IN CONTAMINATED AREAS

- **Heat Stroke is a nightmare no matter where it happens, but workers who develop this condition inside of a contaminated area are in extra danger.**
  - While victims of Heat Stroke need medical help as soon as possible, they must be decontaminated before they can be treated no matter how seriously ill they are.
  - No exceptions can be made to this rule.
- **If this is not done, the victims can spread contamination to anyone who touches them... including the doctors and nurses who treat them.**
  - The medical personnel could then unknowingly contaminate other patients.
  - The end result might be hundreds of injuries or deaths, rather than just one.
- **What should you do if one of your coworkers develops Heat Stress inside of a contaminated area?**
  - First, radio for help at once.
  - Let your supervisor know that a man-down situation exists, and call for a stretcher.
  - While the stretcher is being delivered, your supervisor will contact local paramedics.
- **Meanwhile, load the victim onto the stretcher, then get them to the Contamination Reduction Corridor (CRC) as fast, and as safely, as you can.**
  - Once there, the victim and everyone involved in the rescue will be quickly decontaminated.
  - Emergency decontamination procedures will vary from site to site, depending on what type of contaminants are present.
  - Be sure to consult your supervisor about the emergency decontamination procedures at your work site.
- **When decontamination is over, the victim must be moved to an area away from sources of heat and direct sunlight.**
  - Place cool, moist towels on their skin.
  - If possible, place them in a bath of cool... but not cold... water.
  - This is to lower the affected person's temperature gradually, but not shock them by going from one temperature extreme to another.
- **When the ambulance arrives, give the emergency medical technicians a full report of what happened, and let them know what hazardous materials were present where the victim fell.**
  - Your supervisor may also give the ambulance crew MSDSs for the substances that the victim was working around.
- **First-aid for Heat Stroke is easier in uncontaminated areas, where there is no need to send the victim through a CRC. Otherwise, the same basic rules apply:**
  - Call for medical help immediately.
  - Do what you can to cool the victim down while you wait.

## PREVENTING HEAT STROKE

- **In most cases, Heat Stroke is preventable. As with other forms of Heat Stress, the key is to:**
  - Drink electrolyte-replacing fluids.
  - Take breaks in cool areas to keep from overheating.
- **In addition to proper fluid intake and taking periodic breaks, there are other procedures you can follow to decrease your chances of Heat Stress.**
  - For example, going through an acclimatization process is very important.

## ACCLIMATIZATION

- **Acclimatization means getting used to wearing your PPE over a gradual period of time.**
  - This will be a part of the hazardous materials training program that your work group participates in.
  - Without acclimatizing, you are more prone to become overheated when you wear your PPE... and that can lead to Heat Stress.
- **Workers who are not acclimatized also face an increased risk of fainting in warm or humid environments.**
  - This can lead to a fall, which in turn can cause injuries and exposure to hazardous substances.
- **So take a break as soon as you can if you become dizzy or lightheaded.**
  - A rapid heart rate and moist skin can also indicate that you are about to pass out.
  - If you develop any of these symptoms, seek medical attention as soon as possible.
- **Acclimatization deals with what you wear during hazardous materials operations. But sometimes what is inside of you is as important as what is on the outside.**
  - For example, if you're taking medication, it's a good idea to ask your doctor whether any side-effects will occur if you work in high heat areas.

## OTHER WAYS TO PREVENT HEAT STRESS

- **Eating wisely is also important.**
  - Hot and heavy meals add heat to your body.
  - They also divert blood to your digestive system that would normally help to cool you off.
  - So, if there is any possibility of you overheating, eat light, cool meals during the workday.
- **Light and cool should also describe what you wear next to your skin.**
  - If you know that you are going into a hot situation, you will want to wear loose, lightweight clothing beneath your chemical-protective suit.
  - Cotton is often the fabric of preference.
  - Shirts and pants made of cotton or cotton blends don't trap excess heat as much as some artificial fibers do.
  - Cotton also absorbs sweat, which helps to keep you cool.
- **In some situations, you may want to wear an ice vest, as well.**
  - This fits around your upper torso under your innermost chemical-protective suit, and contains a reusable coolant.
  - After a few hours in a freezer, an ice vest is ready for use.
  - It keeps most of your chest, back and upper abdomen cold, and as a result, you sweat less.
  - This, in turn, lowers your chances of Heat Stress.
- **There are only two potential drawbacks to using an ice vest.**
  - A vest does add to the weight that you are already carrying.
  - A vest is only a short-term solution to heat problems because the ice in the vest eventually melts.
  - Still, for many hazardous materials operations that involve quick trips into contaminated areas, ice vests can be a useful way to beat the heat.