

## Introduction to the Leader's Guide

The Pulp and Paper Health and Safety Association's **Safety Meeting Topics** are self-contained instructional packages designed to be presented by individuals responsible for conducting safety meetings for workers. Each package contains everything needed to conduct short, effective meetings on a variety of safety topics. The packages are designed for a one-half to one-hour presentation.

## The role of safety meetings

Your effectiveness in the workplace rests largely on your ability to communicate with others. Safety meetings are an important way employees and employers can raise and discuss safety issues. Successful safety meetings accomplish a number of important objectives. They raise the level of safety awareness, get employees actively involved, encourage employees to follow proper safety practices and procedures, help to identify hazards in the workplace, and introduce workers to new safety rules, equipment and procedures. They can also provide important information on accident causes and corrective actions to avoid recurrences, and remind individuals of hazards that occur on a seasonal basis.

*The purpose of this safety meeting is to make your crew more aware of the health hazards associated with heat stress, and what precautions to take to avoid heat stress disorders.*

## How to use the guide

The length of the safety meeting depends on which portions of information you wish to emphasize, and whether you want participant involvement through questioning. In addition, you may elect to use your own materials other than those used in the package, as well as site-specific examples. A power point presentation is available for you to download. Or you can print hardcopies for producing overhead transparencies.

In order to lead an effective safety meeting, preparation is essential! The preparation steps are identified on the next page. The Leader's Guide contains easy-to-read instructions as well as general information on heat stress. A checklist is also provided on page 3 of this guide to help you make all the necessary preparations for the meeting.

## **STEP 1**

Read over the information in this guide to familiarize yourself with all the information on the health hazards associated with heat stress.

## **STEP 2**

Examine the page entitled "Session Map" on page 18. This illustrates the overall sequence of the presentation. It is also provided on an overhead hardcopy to be used at the beginning of the meeting as you give a brief overview of the material to be covered.

## **STEP 3**

Study the "Presentation Guide" starting on page 19. The boxes explain each step to follow as you conduct the meeting. The illustrations located in the margin next to the boxes indicate when to use an overhead or when to refer to the Participant's Guide. Sometimes you will need to do both. Points of information are also provided beneath some of the boxes. You can refer to these points to elaborate on the topics under discussion. Keep the pages of the presentation guide open as you conduct the meeting.

## **STEP 4**

Look over the "Preparation Checklist" on the following page to see that you have all the things you will need for the safety meeting. If you decide to add handouts or other materials to the presentation, add them to your checklist.

## **Special Instructions**

- Obtain a copy of your company's policy regarding heat stress to use and/or distribute during the safety meeting.



### Preparation Checklist

- Does everyone know when and where the safety meeting is to be held?
- Have you read over the material in advance?
- Have all of the required overhead transparencies been made, and arranged in proper order?
- Do you have a suitable overhead projector, spare bulb, screen and extension cord? Or LCD projector and screen?
- Is the meeting room prepared in advance for the safety meeting?
- Do you have a copy of the Participant's Guide for everyone who will be attending the meeting?
- Do you have a copy of your company's official policy or set of rules pertaining to heat stress?

## About Heat Stress

"Heat Stress" is a term used to describe the total heat load imposed on our body by a combination of factors. These factors include the type of work being performed, the surrounding air temperature, radiant heat, humidity, air movement and the type of clothing being worn. Heat stress places huge demands on our internal cooling system. If the demands are too great, the body's core temperature increases, giving rise to a variety of heat stress disorders. These disorders may range from an irritating heat rash to a life-threatening heat stroke. It is a health and safety concern that must be taken seriously.

In order for our bodies to function normally, we need to maintain our body core temperature within the acceptable range of about 37°C (98.6°F) + 1°C (1.8°F). As our body produces heat during work, it cools itself by increasing the blood flow to the skin in order to radiate heat. If this is not enough to cool us, the sweat glands increase the flow of perspiration to the surface of the skin. As the sweat evaporates, the skin is cooled. This process is made difficult when the surrounding humidity level is high. As we overheat, our physical and mental condition is adversely affected.

The ill effects brought on by heat stress are called heat stress disorders. They affect us in different ways depending on their severity. Mild cases of heat stress cause fatigue, irritability, thirst or a heat rash. As the level of severity increases, heat cramps develop due to a combination of heavy exertion, loss of bodily fluids and body salts. Fainting, heat exhaustion and heat stroke are the three most severe effects of heat stress. Each can be life-threatening and require immediate medical attention.

Heat is a physical stressor that is often hard to avoid. But there are a number of available ways in which to reduce the risk of suffering heat stress disorders. The first line of defence should be engineering controls such as: ventilation and air-conditioning systems; insulation or the shielding of heat sources from nearby workers; and providing cool rest areas for workers. Administrative controls and work practices include such things as: rescheduling hot work for cooler times of the day, reducing worker' exposure time to the heat, allowing workers adequate time to acclimatize themselves to hotter environments, providing cool drinking water and ice machines, providing health and safety awareness training, and ensuring that frequent rest breaks are taken. Personal protective equipment is also a very important control measure. Light-coloured clothing and hats are effective at reflecting radiant heat. Loose-fitting clothing should be worn when humidity levels are high. And under extreme conditions, air and water-cooled garments or ice packet vests should be considered.

Avoid taking salt tablets. They can cause a higher body temperature, increase thirst and nausea, and do not enter the body as quickly as fluids. If you require a little extra salt because of excessive perspiration, supplement your diet by sprinkling salt on your food or eating a bag of potato chips. Our diets, for the most part, contain plenty of salt. If you are on a special diet, it is advisable to consult a doctor before adding any form of salt to your diet. Hypertension, for example, can be aggravated by increased salt intake.

Heat stress is not only a health hazard, but a safety hazard as well. In hot workplaces, heavy tasks become exhausting, we become easily distracted, our patience is shorter, we are less alert, more irritable and mental and physical tasks requiring skill become much more difficult to perform safely. Is it any wonder that more accidents occur in hot environments?

Make the prevention of heat stress disorders a priority in your workplace. With the proper mix of control measures, work in hot environments can be performed with less risk to the health and safety of all concerned.

*The purpose of this safety meeting is to make your crew more aware of the health hazards associated with heat stress, and what precautions to take to avoid heat stress disorders.*



## True or False?

- ◆ High internal temperature makes blood vessels expand and the heart rate quicken.
  - True**    **False**
  
- ◆ A heat stroke can be fatal.
  - True**    **False**
  
- ◆ Sweating cools the body.
  - True**    **False**
  
- ◆ Operation of the body's cooling system can result in:
  - ◆ Rashes
  - ◆ Dizziness
  - ◆ Swelling
  - ◆ Fainting
  - ◆ death
  - True**    **False**
  
- ◆ If you don't feel thirsty, there is no need to drink water.
  - True**    **False**
  
- ◆ As long as you drink a sufficient amount, the timing of it doesn't matter.
  - True**    **False**

## Disorders Caused by Heat Stress:

- Heat Rash, other skin ailments
- Sunburn
- Heat Cramps
- Fainting
- Heat Exhaustion
- Heat Stroke



## What Is Heat Stress?

Working or playing where it is hot puts stress on your body's cooling system. When heat is combined with other stresses such as hard physical work, loss of fluids, fatigue or some medical conditions, it may lead to heat-related illness, disability and even death.

This can happen to anybody-even the young and fit. In Ontario, heat stress is usually a concern during the summer. This is especially true early in the season, when people are not used to the heat and climate change.

Heat exposure may occur in many workplaces. Furnaces, bakeries, smelters, foundries and heavy equipment are significant sources of heat inside workplaces. For outdoor workers, direct sunlight is the main source of heat. In mines, geothermal gradients and equipment contribute to heat exposure. Humidity in workplaces also contributes to heat stress.

## How We Cope With Heat

Your body is always generating heat and passing it to the environment. The harder your body is working, the more heat it has to lose. When the environment is hot or humid or has a source of radiant heat (for example, a furnace or the sun), your body must work harder to get rid of its heat.

If the air is moving (for example, from fans) and it is cooler than your body, it is easier for your body to pass heat to the environment.

Workers on medications or with pre-existing medical conditions may be more susceptible to heat stress. These workers should speak to their personal physicians about work in hot environments.

Fortunately, the human body is pretty efficient at keeping our body temperatures constant. In order to maintain our body temperatures, the body must release the heat. This is carried out through blood circulation and sweating. As the sweat evaporates, it cools the skin by eliminating heat from the body. In environments with high humidities this process is hindered because the evaporative process is decreased and it is more difficult for the body to cool itself.

### **What the Law Says...**

Employers have a duty under section 25(2) (h) of the Occupational Health and Safety Act to take every precaution reasonable in the circumstances for the protection of a worker. This includes developing hot environment policies and procedures to protect workers in hot environments due to hot processes or hot weather. For compliance purposes, the Ministry of Labour recommends the Threshold Limit Values (TLVs) for Heat Stress and Heat Strain published by the American Conference of Governmental Industrial Hygienists (ACGIH). These values are based on preventing unacclimatized workers' core temperatures from rising above 38 degrees Celsius.

## Early Warning Signs of Heat Stress

- Heavy sweating
- Irritability/difficulty in concentrating
- Thirst
- Skin rash
- Shortness of breath
- Dizziness
- Nausea



## Recognizing & Assessing **Heat Stress Hazards**

### **Heat Rash**

**Cause:** Hot humid environment; plugged sweat glands.

**Symptoms:** Red bumpy rash with severe itching.

**Treatment and Prevention:** Change into dry clothes and avoid hot environments. Rinse skin with cool water. Wash regularly to keep skin clean and dry

### **Sunburn**

**Cause:** Too much exposure to the sun.

**Symptoms:** Red, painful, or blistering and peeling skin.

**Treatment and Prevention:** If the skin blisters, seek medical aid. Use skin lotions (avoid topical anesthetics) and work in the shade. Cover skin with clothing; apply skin lotions with a sun protection factor of at least 15. People with fair skin should be especially cautious.

### **Heat Cramps**

**Cause:** Heavy sweating drains a person's body of salt, which cannot be replaced just by drinking water.

**Symptoms:** Painful cramps in arms, legs or stomach which occur suddenly at work or later at home. Heat cramps are serious because they can be a warning of other more dangerous heat-induced illnesses.

**Treatment and Prevention:** Move to a cool area; loosen clothing and drink cool salted water (1 tsp. salt per gallon of water) or commercial fluid replacement beverage. If the cramps are severe or don't go away, seek medical aid. Reduce activity levels and/or heat exposure. Drink fluids regularly. Workers should check on each other to help spot the symptoms that often precede heat stroke.



### Fainting

**Cause:** Fluid loss and inadequate water intake.

**Symptoms:** Sudden fainting after at least two hours of work; cool moist skin; weak pulse.

**Treatment and Prevention:** GET MEDICAL ATTENTION. Assess need for CPR. Move to a cool area; loosen clothing; make person lie down; and if the person is conscious, offer sips of cool water. Fainting may also be due to other illnesses. Reduce activity levels and/or heat exposure. Drink fluids regularly. Workers should check on each other to help spot the symptoms that often precede heat stroke.

### Heat Exhaustion

**Cause:** Fluid loss and inadequate salt and water intake causes a person's body's cooling system to start to break down.

**Symptoms:** Heavy sweating; cool moist skin; body temperature over 38°C; weak pulse; normal or low blood pressure; person is tired and weak, and has nausea and vomiting; is very thirsty; or is panting or breathing rapidly; vision may be blurred.

**Treatment and Prevention:** GET MEDICAL AID. This condition can lead to heat stroke, which can kill. Move the person to a cool shaded area; loosen or remove excess clothing; provide cool water to drink; fan and spray with cool water. Reduce activity levels and/or heat exposure. Drink fluids regularly. Workers should check on each other to help spot the symptoms that often precede heat stroke.

### Heat Stroke

**Cause:** If a person's body has used up all its water and salt reserves, it will stop sweating. This can cause body temperature to rise. Heat stroke may develop suddenly or may follow from heat exhaustion.

**Symptoms:** High body temperature (over 41°C) and any one of the following: the person is weak, confused, upset or acting strangely; has hot, dry, red skin; a fast pulse; headache or dizziness. In later stages, a person may pass out and have convulsions.

**Treatment and Prevention:** CALL AMBULANCE. This condition can kill a person quickly. Remove excess clothing; fan and spray the person with cool water; offer sips of cool water if the person is conscious. Reduce activity levels and/or heat exposure. Drink fluids regularly. Workers should check on each other to help spot the symptoms that often precede heat stroke.

# Controlling Heat Exposures

## Acclimatization

The longer you work hard in the heat, the better your body becomes at adjusting to the heat. If you are not used to working in the heat then you should take a week or two to let your body adapt to the heat. This is called “acclimatization”. If you are ill or away from work for a week or so, you can lose your acclimatization.

There are two ways to acclimatize:

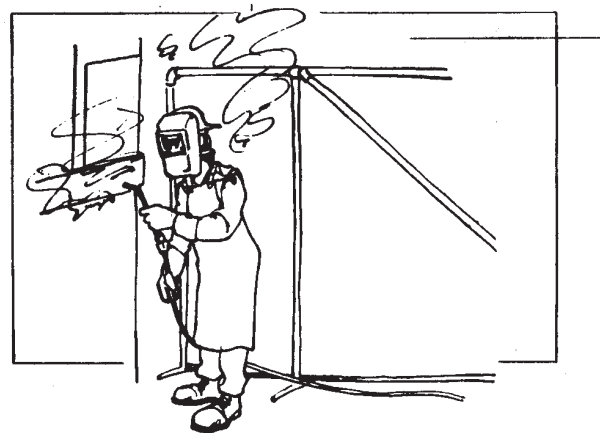
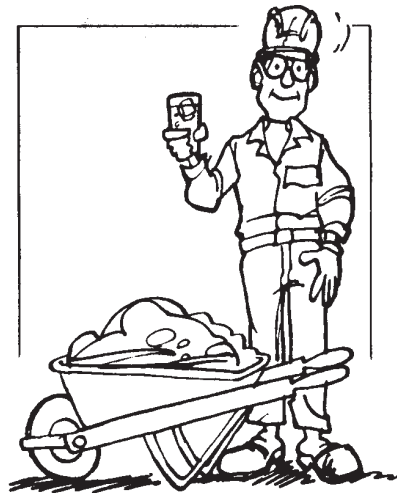
If you are experienced on the job, limit your time in hot working conditions to 50 percent of the shift on the first day, 60 per cent of the shift on the second day, and 80 per cent of the shift on the third day. You can work a full shift the fourth day.

If you are not experienced on the job (if you are, for example, a summer student), you should start off spending 20 per cent of the time in hot working conditions on the first day and increase your time by 20 per cent each subsequent day.

Instead of reducing the exposure times to the hot job, you can become acclimatized by reducing the physical demands of the job for a week or two.

If you have health problems or are not in good physical condition, you may need longer periods of acclimatization. Hot spells in Ontario seldom last long enough to allow acclimatization. However, exposure to workplace heat sources may permit acclimatization.

When it is hot, consider the following Engineering and Administrative controls recommended by the Ministry of Labour



### Engineering Controls

- Control the heat at its source through the use of insulating and reflective barriers (e.g. insulate furnace walls).
- Exhaust hot air and steam produced by operations.
- Reduce the temperature and humidity through air cooling.
- Provide air-conditioned rest areas.
- Provide cool work areas.
- Increase air movement if temperature is less than 35°C (fans).
- Reduce physical demands of work task through mechanical assistance (hoists, lift-tables, etc.).

### Administrative Controls

- The employer should assess the demands of all jobs and have monitoring and control strategies in place for hot days and hot workplaces.
- Increase the frequency and length of rest breaks.
- Schedule strenuous jobs to cooler times of the day.
- Provide cool drinking water near workers and remind them to drink a cup every 20 minutes or so.
- Caution workers to avoid direct sunlight.
- Assign additional workers or slow down the pace of work.
- Make sure everyone is properly acclimatized.
- Train workers to recognize the signs and symptoms of heat stress and start a “buddy system” since people are not likely to notice their own symptoms.
- Pregnant workers and workers with a medical condition should discuss working in the heat with their doctor.
- First Aid responders and an emergency response plan should be in place in the event of a heat-related illness.
- Investigate any heat-related incidents.

### Personal Protective Equipment

- Light summer clothing should be worn to allow free air movement and sweat evaporation.
- Outside, wear light-coloured clothing.
- In a high radiant heat situation, reflective clothing may help.
- For very hot environments, air, water or ice-cooled insulated clothing should be considered.
- Vapour barrier clothing, such as chemical protective clothing, greatly increases the amount of heat stress on the body, and extra caution is necessary.

## How Hot is Too Hot? The Body & Humidex

When your body temperature rises even a few degrees above normal (about 37 C or 98.6 F), you can experience muscle cramps, become weak, disoriented, and dangerously ill unless you can help your body to cool down. If your body temperature rises above 41 C or 105 F, your condition can be fatal.

The web site ([www.ohcow.on.ca](http://www.ohcow.on.ca)) of the Occupational Health Clinics for Ontario Workers (OHCOW) provides a calculator to help employers decide what to do for their workers in hot weather. You input the temperature and humidity and the calculator gives such responses as "no discomfort", "provide water", "reduce activity - 50% work", etc.

The calculator works on a correlation with the current American Conference of Governmental Hygienists (ACGIH) heat Stress and Strain Threshold Limit Values. The correlation is based on unacclimatized workers doing moderate work (care should be taken when assigning workload categories since age, weight and gender also need to be taken into account). This correlation also only applies to workers wearing light summer clothing – those wearing coveralls, heavy protective clothing, impervious suits, etc., need to be evaluated according to the TLV.

The Humidex-based Heat Response Plan is not appropriate for unacclimatized workers in the heavy or very heavy workload categories. Special considerations also need to be made for those with medical conditions and/or those taking medications that will render them more susceptible to heat strain. Measurements should be taken in the workplace in representative areas as least hourly when conditions are of concern.

**Regardless of what the temperature is ... at any stage, never ignore symptoms even if measurements meet standards!**



## Managing Heat Stress from Process Heat

For an environment that is hot primarily due to process heat (furnaces, bakeries, smelters, etc.), the employer should follow the guidance of the American Conference of Governmental Industrial Hygienists (ACGIH) as outlined in its booklet and documentation for the recommended Threshold Limit Values (TLVs), and set up a heat stress control plan in consultation with the workplace's joint health and safety committee or worker health and safety representative.

Further information on the ACGIH TLVs, and on the development of heat stress control plans, may be found at the following websites:

<http://www.acgih.org/home.htm>

[http://www.osha.gov/dts/osta/otm/otm\\_iii/otm\\_iii\\_4.html](http://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_4.html)

## Managing Heat Stress Induced by Hot Weather

Most workplaces don't have "hot processes" but working in hot weather can pose health risks to their workers. For hot work environments due to hot weather, a hot weather plan is appropriate. A hot weather plan is a simplified heat stress control plan. A hot weather plan should establish the implementation criteria, or "triggers", to put the plan into effect. The criteria may include:

Weather/environmental indicator triggers such as:

- Humidex reaching or exceeding 35° Celsius
- Environment Canada Humidex advisory (air temperature exceeding 30° Celsius and Humidex exceeding 40° Celsius) or Ontario Ministry of the Environment smog alert;
- Environment Canada weather reports; and/or
- Heat waves (three or more days of temperatures of 32° or more)

Generally, plans related to hot weather should be in place between May 1 and September 30 of each year.

The following websites have information on Humidex, Weather Reports and Smog Alerts:

### Environment Canada Humidex Calculator

[http://lavoieverte.qc.ec.gc.ca/meteo/Documentation/Humidex\\_e.html](http://lavoieverte.qc.ec.gc.ca/meteo/Documentation/Humidex_e.html)

### Environment Canada Weather Office

[http://www.weatheroffice.ec.gc.ca/canada\\_e.htm](http://www.weatheroffice.ec.gc.ca/canada_e.htm)

## Hot Tips!

### Engineering controls

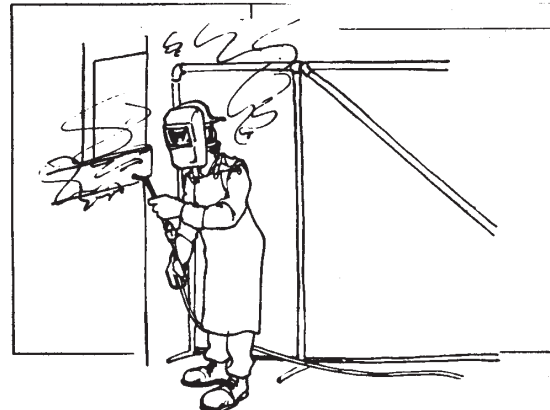
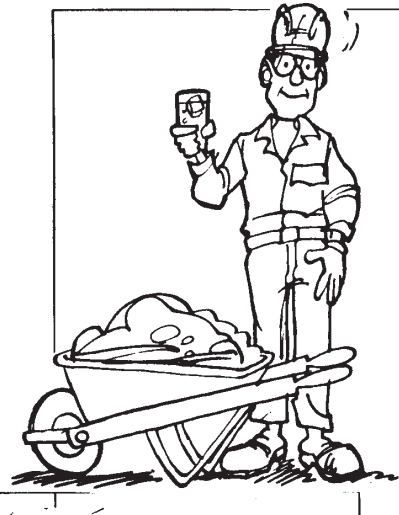
- Fans to increase air movement
- Exhaust fans
- Air conditioning
- Air conditioned rest areas
- Ergonomic solutions

### Administrative controls & Work practices

- Schedule hot jobs for cooler times of the day (e.g. early morning & night shift)
- Schedule maintenance work in hot areas for cooler seasons of the year
- Increase the time and frequency of rest breaks
- Increase the size of work crews to decrease individual exposure time to heat
- Provide cool drinking water and ice machines for work crews
- Design work schedules that acclimatize employees to hotter work environments
- Encourage employees to stay in shape
- Encourage workers to drink plenty of water before & during work in hot areas

### P.P.E.

- Hats
- Loose-fitting clothing
- Bright coloured clothing
- Wetted overgarments
- Ice packet vests
- Water-cooled garments
- Air-cooled garments



## How Much Water do You Need?

It can not be stressed enough how important it is to drink plenty of water while working under hot conditions. If the water lost through sweating is not replaced, it will result in dehydration and a reduction in the volume of circulating blood in your body. Lack of fluid intake also creates an imbalance in salt levels (electrolyte imbalance) leading to heat stress disorders. Drink six to eight ounces of cool water every 20 minutes or so when it's hot to avoid this type of imbalance. It is also a wise precaution to drink a cup of cool water before you even begin to work.

### Sources:

Water and/or Fruit Juices  
Electrolyte Drinks like Gatorade  
Fruits and Vegetables

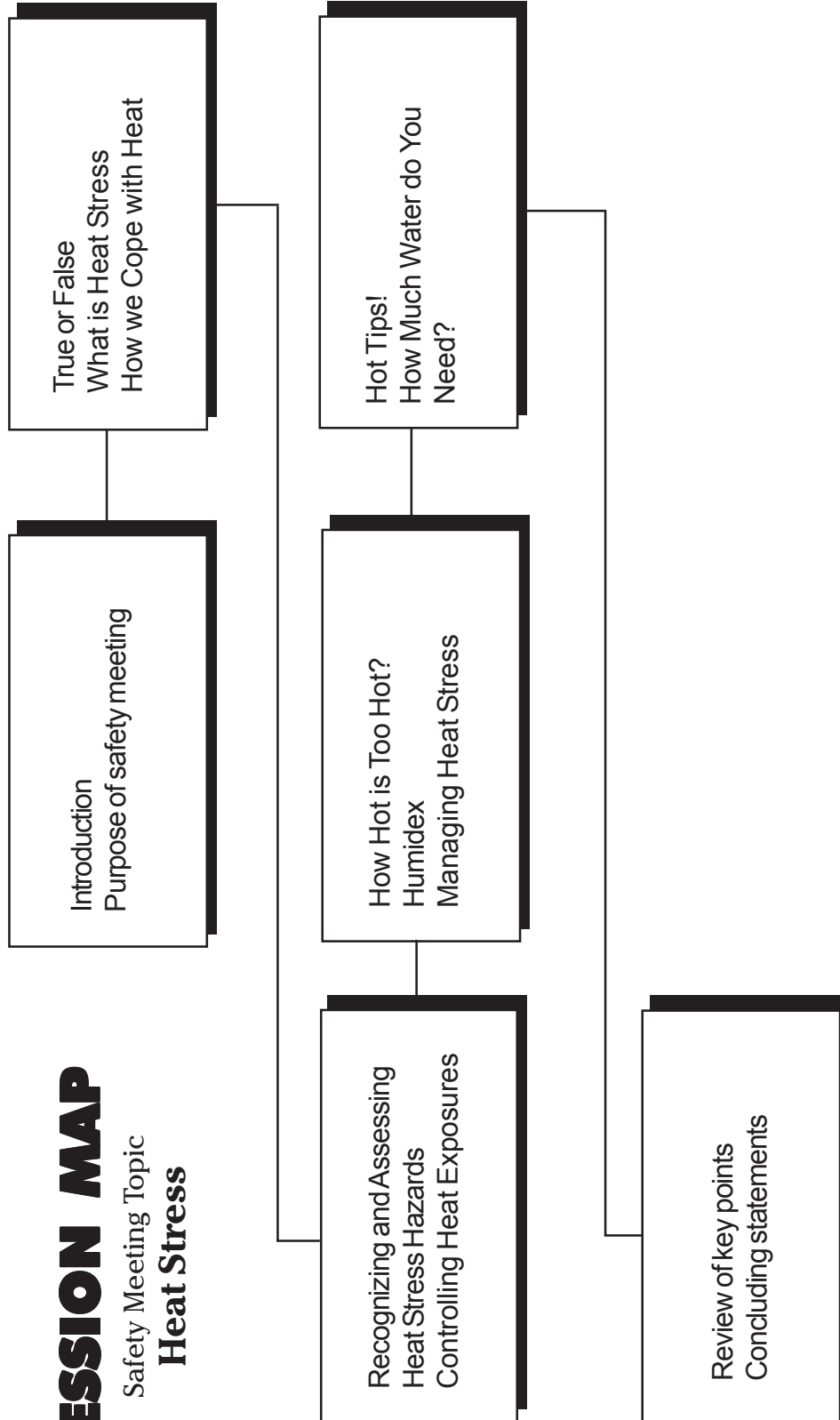
### Note:

Electrolyte drinks are usually not necessary. Stay away from caffeinated, carbonated diet drinks and alcohol as they take water out of your body.

Dehydration Level	Cum. Fluid Loss	% Body Wt.	Time to Reach*	Symptoms and Effects
Minor Dehydration	1.5 lb. (.75 L)	1%	1 hour	Generally not perceived.
Incipient Stress	3.0 lb. (1.5 L)	2%	2 hours	Begin thirsty, hot, minor discomfort.
Advanced Stress	4.0 lb. (2.25 L)	3%	3 hours	Loss of energy, muscle endurance.
Heat Cramping	6-9 lb. (3-4 L)	4-6%	4-5 hours	Impaired coordination, endurance. Less energy, strength. Fatigue, cramps.
Heat Exhaustion	9-12 lb. (4-5.5 L)	6-8%	6-7 hours	Headache, Dizziness, Nausea. Serious fatigue.
Heat Stroke	11+ lb. (5+ L)	7+%	7+ hours	High temperature, Confusion, Loss of consciousness.

\* based on a 150 lb. male performing moderately active work in hot weather and not drinking to replace fluids

**SESSION MAP**  
Safety Meeting Topic  
**Heat Stress**



## Presentation Guide

### Use slide 1



- Introduce the topic of heat stress and explain the purpose of the meeting
- Give a brief overview of the material to be covered using the session map.
- Distribute Participant's Guide



### Use slide 2-4



- Describe what "heat stress" is and what factors cause it
- Discuss work -related heat stress fatalities
- Assess knowledge with quick True and False Quiz (correct answers are highlighted on your copy)



### Emphasize the following points

- Heat stress is a very important health and safety concern
- Identify site-specific examples of where heat stress could occur

**Use slides 5-9**



- Briefly discuss the physiology of heat stress



**Use slides 10-11**



- Identify and discuss the various heat stress disorders
- Remind participants that heat affects people differently based on a number of personal factors



**Refer everyone to Participant's Guide**



- Briefly review the characteristics of the various heat stress disorders described on pages

### Use slide 12



- Identify and discuss the various methods available to control heat stress



### Refer everyone to Participant's Guide



- Briefly review the information on the various methods available to control heat stress



### Use slides 13-14



- Briefly discuss the humidex and methods of measuring

*\*Refer participants to resources listed in their participant manual.*

## Use slide 15



- Discuss the importance of fluid replacement

*Refer participants to the detailed information and chart in their participant manual*



## Use slide 16 - 17



- Review quick tips and things to look for regarding heat stress signs and symptoms
- Remind participants to ensure they drink enough water in hot work environments



## Review & Conclusion

- Review the key points about heat stress
- Emphasize that it is crucial that everyone be aware of the potential health & safety risks associated with heat stress; and take the necessary precautions to prevent heat stress disorders from happening.

# Other Safety Meeting Topics Available:

Hand Injuries  
Aches and Pains  
Confined Space Entry  
Eye Safety  
Fire Safety  
Hearing Protection  
Living With Shiftwork  
Planned Workplace Inspection  
Press Safety\*  
Summer Safety  
Winter Driving  
Zero Energy State: Lockout

**New titles are added each year, so be sure to inquire about topics that may not be listed.**

*\* includes a video supplement*

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