

2013

Heat Related Illness



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DISCLAIMER

The following safety related program is for informational purposes only. The SORT committee hopes that each participating district will look at this program and discuss how it compares to the district's own practices. This program is NOT a complete safety program, but intended as guidelines. There is no guarantee that following a given program will eliminate or substantially reduce the risk of claim or injuries. It is expected that member districts will consider this program and adapt or modify it to fit the district's particular needs and circumstances.

HEAT RELATED ILLNESS

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PURPOSE / SCOPE

To ensure that all employees are protected from heat illness while working on job tasks where environmental risk factors for heat illness are present and to establish the requirements for working in such an environment.

Policy

It is the policy of **your district** that all employees spending time in the field or any environment where a heat-related illness may take place, will comply with this Heat-Related Illness Prevention Program and are encouraged to actively participate in identifying ways to reduce the risk of experiencing heat-related illness in the work place.

DEFINITIONS

Acclimatization

Acclimatization means the body's biological adaptations that reduce physiologic strain (e.g., heart rate and body temperature), improve physical work capabilities, improve comfort and protects vital organs (brain, liver, kidneys, muscles) from heat injury. The most important biological adaptation from heat acclimatization is an earlier and greater sweating response.

Drinking water

Drinking water means water satisfying the Department of Health's requirements as potable water suitable for drinking by the public. Water packaged as a consumer product is an acceptable source of drinking water.

Environmental factors for heat-related illness

Environmental factors for heat-related illness means working conditions that increase the susceptibility for heat-related illness including air temperature, relative humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, protective clothing and personal protective equipment worn by employees.

Heat-related illness

Heat-related illness means a medical condition resulting from the body's inability to cope with a particular heat load, and includes, but is not limited to, heat cramps, heat rash, heat exhaustion, fainting, and heat stroke.

Personal factors for heat-related illness

Personal factors for heat-related illness means factors including, but not limited to, an individual's age, degree of acclimatization, medical conditions, water consumption, alcohol consumption, caffeine consumption, nicotine use, and use of prescription and non-prescription medications that affect the body's water retention or other physiological responses to heat.

Shade

Shade means the blockage of direct sunlight. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight.

EXEMPTIONS / EXCLUSIONS

None

HAZARD ANALYSIS

Hazard Description

Heat-related illness can occur when combinations of external heat sources (e.g. ambient air temperature, radiant heat) and metabolic heat production (e.g. heat produced by muscular activity) overwhelm the body's ability to regulate its temperature. If someone's heart begins to pound, they find it difficult to breathe, become lightheaded, confused, weak or faint, heat-related illness should be assumed. They should stop all activity and be provided with a means to quickly cool them, and be monitored during recovery.

Heat-related illnesses do not always occur in the same way – a person can go from muscle cramps straight to heat stroke quickly and without experiencing any other signs or symptoms. Also, heat-related illness may progress over several days. This is why it is important to identify symptoms of heat-related illness promptly and treat them all seriously. All employees must know the signs and symptoms of heat-related illness and the District's plan for providing first aid and, if necessary, contacting emergency medical services.

While heat exhaustion and heat stroke are considered "severe" heat-related illnesses, heat rash and heat cramps are also dangerous. For example, heat rash can interfere with your performance and even result in temporary work removal.

The signs and symptoms listed below are not necessarily an accurate method to assess a person's condition, since responses to heat vary from person to person and from day to day. However, one should assume the possibility of heat-related illness whenever employees are experiencing any of the signs or symptoms listed below. **(More in-depth training in heat-related illness will be given annually to each employee.)**

| Heat-Related Illness | Symptoms you may experience | Signs to look for in others | Treatment (Source: WA DOSH, Department of L&I) |
|----------------------|--|---|--|
| Heat Rash | <ul style="list-style-type: none"> Red blister-like eruptions Itching (prickly sensation) | <ul style="list-style-type: none"> Red blister-like eruptions | <ul style="list-style-type: none"> Rest in a cool place. Allow the skin to dry. Monitor for infection. |
| Heat Cramps | <ul style="list-style-type: none"> Painful spasms | <ul style="list-style-type: none"> Abnormal body posture Grasping the affected area | <ul style="list-style-type: none"> Rest in a cool place. Drink water or a heavily diluted sports beverage (such as Gatorade). Seek medical attention if cramping is severe or does not go away. |
| Heat Exhaustion | <ul style="list-style-type: none"> Weakness Fatigue Blurred vision Dizziness Headache | <ul style="list-style-type: none"> High pulse rate Extreme sweating Pale face Insecure gait Normal to slightly elevated temperature Clammy and moist skin | <ul style="list-style-type: none"> Lay the worker down in a cool, shaded area; do not leave them alone. Loosen and remove heavy clothing that restricts evaporative cooling. Give cool water to drink, about a cup every 15 minutes. Fan the worker, spray with cool water, or apply a wet cloth to their skin to increase evaporative cooling. Recovery should be rapid. Call 911 if they do not feel better in a few minutes. Do not further expose the worker to heat that day. Have them rest and continue to drink cool water. |
| Heat Stroke | <ul style="list-style-type: none"> Rapid pulse Chills Restlessness Irritability | <ul style="list-style-type: none"> Rapid pulse Red face Hot dry skin (25% - 50% of cases) Disorientation High temperature (P 104° F) Erratic behavior Shivering Collapse Convulsions Fainting <p>HEAT STROKE MAY RESEMBLE A HEART ATTACK</p> | <p>Get immediate medical help; call 911 for transport to a hospital as quickly as possible.</p> <ul style="list-style-type: none"> If the person is alert and not feeling nauseous, have them sip cool water. Move the worker to a cool, shaded area and remove clothing that restricts cooling. Seconds count – Cool the worker rapidly using whatever methods you have available. For example, <ul style="list-style-type: none"> Immerse the worker in a tub of cool water; Place the worker in a cool shower; Spray the worker with cool water from a garden hose; Sponge the worker with cool water; If the humidity is low, wrap the worker in a cool, wet sheet and fan them vigorously. Continue cooling until medical help arrives. If emergency medical help is delayed, call the hospital emergency room for further instructions. |

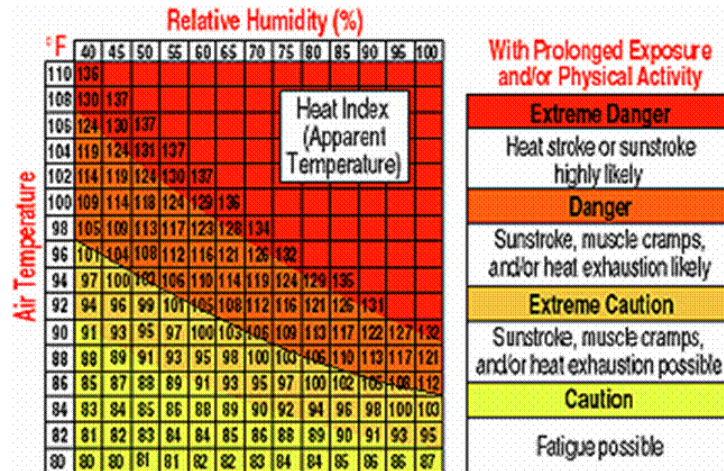
Heat Acclimatization – Acclimatization occurs when repeated heat exposures are sufficiently stressful to elevate body temperature and provoke profuse sweating. Generally, about two weeks of daily heat exposure is needed to induce heat acclimatization. Heat acclimatization requires a minimum daily heat exposure of about two hours (can be broken into two 1-hour exposures) combined with physical exercise that requires cardiovascular endurance. The benefits of heat acclimatization will be retained for ~1 week and then decay with about 75 percent lost by ~3 weeks, once heat exposure ends. (Source: US Army)

Because the weather patterns in Western Washington do not typically remain hot enough for a long enough period of time for acclimatization to occur, **acclimatization is not a factor in the District’s Heat-related Illness Program.**

Heat Index – Working in temperatures greater than 70°F or a 10°F spike in temperature can put you at risk for heat-related illness. High humidity (approaching 80% and greater) is an important factor because it limits sweat production and evaporation.

To evaluate the risk based on temperature and humidity, the heat index will be used. The heat index is the temperature the body feels when heat and humidity are combined. The Heat Index Chart below shows the heat index that corresponds to the actual air temperature and relative humidity. Exposure to direct sunlight can increase the heat index by up to 15°F.

The presence of other environmental factors can also increase the heat index. **The effect of heat stress may be felt at an index of 80 or greater,** as the table below shows.



Work Levels – Physical work produces internal heat in the body. During moderate to heavy work the body needs to compensate in order to rid itself of the excess heat produced. At the same time other environmental factors increase the overall heat load on the body and limit the amount of heat that can be effectively eliminated. Monitoring workload and duration in relation to the other environmental factors is critical in preventing heat-related illness. The District will consider the workload activity and also how long employees perform the activity. The table below will be used to determine what level of workload activity our employees are doing.

Work Level Examples

| Categories | Example Activities |
|------------|---|
| Resting | <ul style="list-style-type: none"> • Sitting quietly • Sitting with moderate arm movements |
| Light | <ul style="list-style-type: none"> • Sitting with moderate arm and leg movements • Standing with light work at machine or bench while using mostly arms • Using a table saw • Standing with light or moderate work at machine or bench and some walking about |
| Moderate | <ul style="list-style-type: none"> • Scrubbing in a standing position • Walking about with moderate lifting or pushing • Walking on level at 3.7 mph while carrying 6.6 lb. weight load |
| Heavy | <ul style="list-style-type: none"> • Carpenter sawing by hand • Shoveling dry sand • Heavy assembly work on a non-continuous basis • Intermittent heavy lifting with pushing or pulling (e.g. pick-and-shovel work) |
| Very Heavy | <ul style="list-style-type: none"> • Shoveling wet sand |

Hazard Evaluation

The Safety Program Coordinator, in consultation with the District’s Managers, has identified the following HRI environmental hazards for District employees:

- Heat and humidity during the hot months of June, July, August, September, and early October where the day time Heat Index may exceed 80;
- Lack of access to shade while engaged in physical work for extended periods of time in the maintenance and or repair of water and sewer transmission lines;
- Work inside of enclosed or confined spaces with limited air movement;
- Radiated and conductive heat from asphalt road ways and equipment such as the vacuum truck;
- Heavy clothing including boots and gloves, depending on job duties, to protect workers from hazardous or rough working conditions, and to protect skin from excessive UV sun exposure; and
- Body harnesses for fall protection systems, which restrict air circulation in clothing for cooling.

Methods of Hazard Evaluation

The Safety Program Coordinator and the Managers for the District will use the following methods on a day-to-day basis to evaluate each day’s heat risks:

- Realize that outdoor project work levels are typically moderate to heavy.
- Monitor weather reports for forecasts about expected temperature, humidity, and cloud cover;

- We will use the consensus of three Internet weather forecasting services that provide hourly forecasts for the Sammamish area:
- MSN Hourly Weather forecast for Lynnwood, WA
- <http://weather.msn.com/local.aspx?wealocations=wc:USWA0245>
- The AccuWeather.com Hour by Hour forecast for Lynnwood, WA,
- <http://www.accuweather.com/us/wa/lynnwood/98087/city-weather-forecast.asp?partner=accuweather&u=1&traveler=0>
- The Weather Channel hourly forecast for Lynnwood, WA
- <http://www.weather.com/weather/local/98087?lsw=98087&lwsa=WeatherLocalUndeclared&from=whatwhere>
- Declare an HRI Hazard Alert for the day when the adjusted forecasted Heat Index is 80 or greater.

Exposure Determination

The following list shows job duties and work locations where District employees may be exposed to heat-related illness hazards:

HRI Hazard Exposures

| Job Duties | Work locations |
|--------------------------|---|
| Locators | Ground – street or right-of-way |
| Inspectors | Ground – job sites - street or right-of-way |
| Maintenance | Ground – job sites - street or right-of-way |
| Confined Space Personnel | Tanks, manholes, and vaults |
| Meter Readers | Ground – sidewalks, parking lots - street or right-of-way – job sites |
| Summer Help | Ground – facility landscaping –job sites – street or right-of-way |

RESPONSIBILITES

Safety Program Coordinator

- Establish and update the written Heat-Related Illness Prevention Program.
- Provide consultation/training to departments who fall within the Program.
- Assist departments in determining when and where an HRI hazard condition exists.
- Monitor the MSN Hourly Weather Forecast during the critical months of June, July, August, September, and early October to assess the probability of occurrence of an HRI hazard situation during the workday.
- Provide an HRI Hazard Alert to the District Managers when the forecast indicates a probability of the Heat Index being 80 or greater.
- Maintain training records.

Managers

- Require that all affected employees receive proper training on heat-related illness prevention and comply with all appropriate procedures.
- Ensure that adequate water and shade are available at the job site when the **environmental factors for heat-related illness** have generated an HRI Hazard Alert notice.
- Contact 9-1-1 to request emergency medical services in the event emergency medical assistance is required.
- Arrange for transport to Urgent Care or an employee's personal physician when an employee asks for medical consultation after experiencing a lesser heat-related illness on the job (Heat Rash or Heat Cramps).

Employees

- Awareness and compliance with all appropriate heat-related illness prevention procedures during HRI Hazard Alert periods while performing assigned duties.
- Employees are ultimately responsible for drinking adequate amounts of hydrating fluids during HRI Hazard Alert periods.
- Inform their manager or project lead if shade and/or water are inadequate.
- Employees are responsible for identifying, evaluating, and controlling **their individual personal factors for heat-related illness**.
- Report symptoms of heat related illness promptly to their manager or project lead.
- Contact 9-1-1 to request emergency medical services in the event emergency medical assistance is required.

GUIDELINES/RULES

Required PPE

None

Prevention Actions

When an HRI Hazard Alert is in effect, the following prevention actions will be followed:

Work Schedules and Work Loads – Managers will adjust the schedules of outdoor work so as to reduce the exposures to HRI environmental factors as much as possible during an HRI Hazard Alert. The workloads during HRI Hazard Alert periods will be adjusted, as needed, to reduce the exposures to HRI environmental factors.

Provision of Water – Employees shall have ready access to potable drinking water. Where water is not plumbed, or otherwise continuously supplied, it will be provided in sufficient quantity to provide one quart per employee per hour for drinking for the duration of the HRI Hazard Alert. The frequent drinking of water, as described in the training section, will be encouraged.

To meet this requirement, THE DISTRICT may use one or more of the following methods when an HRI Hazard Alert is in effect:

- **Provide bottled water to each crew person.**
- **Provide water cooler jugs to crews – individual crew persons would be responsible for filling the jugs and maintaining them in a sanitary condition.**
- **Provide individual water bottles, which the employee will be responsible for filling for their individual use and for maintaining in a sanitary condition.**
- **Other methodologies may be adopted that meet the fundamental requirements for provision of water in the stated amounts.**

Water Breaks – During an HRI Hazard Alert period, crews working in the field will be reminded of the need for water breaks at the morning meetings.

Rest Breaks – Managers and project leads will adjust the frequency and duration of breaks during HRI Hazard Alert periods as needed. Employees are advised to rest sitting or lying down in a shaded area, rather than standing up or walking around in the sun.

Access to Shade – Employees suffering from heat illness or believing a preventative recovery period is needed, will be provided access to an area with shade that is either open to the air or is provided with ventilation or cooling for a period of no less than five minutes. Such access to shade shall be permitted at all times.

High Heat Index – If the adjusted Heat Index is forecast to be 90 or higher, DISTRICT personnel engaged in heavy or very heavy work will use the buddy system to watch out for each other. Buddy groups can be 2 or 3 people. During these times, staff should review what to look for in themselves and each other to spot heat-related illness symptoms.

Communications – When an HRI Hazard Alert is in effect; managers and project leads will make sure their crews always have open channels of communication, to request breaks, water, or help. Crewmembers will use truck-mounted radios to communicate with the District to be in touch with someone who has a working phone (either a cell phone or land line) and can call 9-1-1 immediately, if needed.

EMERGENCY PROCEDURES

For HEAT CRAMPS:

- Rest in a cool place.
- Drink water or a heavily diluted sports beverage (such as Gatorade).
- Seek medical attention if cramping is severe or does not go away.
- Advise your manager or another responsible District person of the situation.

For HEAT EXHAUSTION:

- Lay the worker down in a cool, shaded area; do not leave them alone.
- Loosen and remove heavy clothing that restricts evaporative cooling.
- Give cool water to drink, about a cup every 15 minutes.
- Fan the worker, spray with cool water, or apply a wet cloth to their skin to increase evaporative cooling.

- If a supervisor is not on the scene, advise them or another responsible District person of the situation as soon as possible.
- Recovery should be rapid. **Call 911 if they do not feel better in a few minutes.**
- **Do not further expose the worker to heat that day.** Have them rest and continue to drink cool water.

For HEAT STROKE:

- **Get immediate medical help; call 911 for transport to a hospital as quickly as possible.**
- If the person is alert and not feeling nauseous, have them sip cool water.
- Move the worker to a cool, shaded area and remove clothing that restricts cooling.
- Seconds count – Cool the worker rapidly using whatever methods you have available.
For example,
 - Immerse the worker in a tub of cool water;
 - Place the worker in a cool shower;
 - Spray the worker with cool water from a garden hose;
 - Sponge the worker with cool water;
 - If the humidity is low, wrap the worker in a cool, wet sheet and fan them vigorously.
- **If a supervisor is not on the scene, advise them or another responsible District person of the situation as soon as possible.**
- Continue cooling until medical help arrives.
- If emergency medical help is delayed, call the hospital emergency room for further instructions.

For Emergency Medical Service:

If emergency medical services appear to be needed, ALWAYS call 9-1-1. Do not attempt to transport the person yourself. If your supervisor is not on the scene, advise them or another responsible District person that 9-1-1 has been called as soon as possible.

If a worker has any of the signs of less severe heat-related illness, (Heat Rash or Heat Cramps) and feels in need of medical assistance, **do not let them drive or transport themselves** to Urgent Care or their doctor. Advise your manager of the need and arrangements will be made for someone from the District to take him or her.

FORMS USED

Training Completion form

TRAINING

All employees, irrespective of whether they are working in job tasks where environmental factors for heat-related illness are present, will receive training. All managers will also receive training. This training will be provided prior to outdoor work assignments presenting heat-related illness hazards, and at least annually thereafter. The training will cover, at minimum the subject areas identified in WAC 296-62-09560, Information and training.

The required materials and training outline, for the annual in-depth training in heat-related illness, will be found in the Safety and Health Training and Education portion of the DISTRICT Accident Prevention Program manual.

COLD-RELATED ILLNESSES

Injuries and Treatment

There are two injuries of concern with cold weather: frostbite and hypothermia. Frostbite is literally the freezing of parts of the body exposed to the cold. At greatest risk are the hands, fingers, toes, and face.

A person suffering from frostbite will have skin that is cold, waxy, and possibly discolored. Handle the frostbitten part of the body very gently; **DO NOT RUB** the affected area. Warm the area by soaking it in warm water, not hot, until it looks red and feels warm to the touch. Place a loose, sterile dressing around the affected area and seek medical attention immediately.

Hypothermia occurs when the body loses heat faster than it can replace it. It does not have to be very cold for a person to fall victim to hypothermia. In fact, most cases of hypothermia occur when it is raining and relatively warm.

A person suffering from hypothermia may have uncontrolled shivering, glassy eyes, and slurred speech. Get them into warm, dry clothing or wrap them in a blanket immediately. Keep the victim in a warm place, but do not try to warm them too quickly as this can cause heart problems. If they are conscious and alert give them warm liquids. Seek medical attention immediately.

Prevention

Keeping yourself warm and dry is obviously an important key to avoiding cold-related illnesses. Dressing in layers is more effective in keeping warm than wearing a single, heavy overcoat. Polypropylene and other synthetic fibers keep you warmer than cotton, but they also breathe, which allows perspiration to escape from the skin. In rainy weather it is essential that you wear your rain gear. You will not stay warm if you are wet.

Remember to protect the extremities. Wool or wool-blend socks are excellent for keeping your feet warm. More heat escapes from the head than any other part of the body so wear a cap, hood, or other protection.

Aside from wearing proper clothing, take breaks to warm yourself and don't forget to drink plenty of fluids throughout the day.

REFERENCES/RESOURCES

Washington Administrative Code 296-62-095

<http://www.lni.wa.gov/safety/topics/atoz/heatstress/default.asp>