

Midland Engineering Co., Inc. Safety Management System			Doc No:	HEAT
			Initial Issue Date	12/09/15
			Revision Date:	Initial Version
44-Heat Illness Prevention			Revision No.	0
			Next Review Date:	12/09/16
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PURPOSE

The purpose of this procedure is to establish guidelines for preventing and recognizing heat illnesses. This heat prevention program/procedure shall be made available to employees of Midland Engineering Co., Inc.

SCOPE

This procedure applies to all operations involving Midland Engineering Co., Inc.

REFERENCES

Cal/OSHA T8 CCR 3395

INTRODUCTION

Working where it is hot puts stress on our body's cooling system. When the 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 program is designed to bring awareness about the warning signs of heat illness and how to respond if they do happen.

PROCEDURE

Procedures must be in place to control the effects of environmental factors that can contribute to heat related illness. The most common environmental factors are air temperature, humidity, radiant heat sources and air circulation.

Engineering Controls

The best way to prevent heat-related illness is to make the work environment cooler. A variety of engineering controls can reduce workers' exposure to heat:

- Air conditioning (such as air-conditioned crane or construction equipment cabs, air conditioning in break rooms).
- Increased general ventilation.
- Cooling fans.
- Local exhaust ventilation at points of high heat production or moisture (such as exhaust hoods in laundry rooms).
- Reflective shields to redirect radiant heat.
- Insulation of hot surfaces (such as furnace walls).
- Elimination of steam leaks

Heat Stress Monitoring Plan

The site supervisor will assess the condition of the employees, specific weather conditions, work tasks, and other environmental factors and conditions to determine when to begin monitoring. Heat affects individuals differently and some of the factors that contribute to these differences are:

- Age, weight, physical fitness
- Metabolism, medications, and alcohol/drug use
- Air temperature, humidity, radiant heat sources, and clothing

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PROVISION OF WATER

Employees shall have access to potable drinking water meeting the requirements of Sections 1524, 3363, and 3457, as applicable, including but not limited to the requirements that it be fresh, pure, suitably cool, and provided to employees free of charge. The water shall be located as close as practicable to the areas where employees are working. Where drinking water is not plumbed or otherwise continuously supplied, it shall be provided in sufficient quantity at the beginning of the work shift to provide one quart per employee per hour for drinking for the entire shift. Employers may begin the shift with smaller quantities of water if they have effective procedures for replenishment during the shift as needed to allow employees to drink one quart or more per hour. The frequent drinking of water, as described in subsection (h)(1)(C), shall be encouraged.

ACCESS TO SHADE

Midland Engineering Co., Inc. will ensure employees have access to shade when the temperature exceeds 80 degrees Fahrenheit. When the outdoor temperature in the work area exceeds 80 degrees Fahrenheit, the employer shall have and maintain one or more areas with shade at all times while employees are present that are either open to the air or provided with ventilation or cooling. The shade shall be located as close as practicable to the areas where employees are working.

Where Midland Engineering Co., Inc. can demonstrate that it is infeasible or unsafe to have a shade structure, or otherwise to have shade present on a continuous basis, the company may utilize alternative procedures for providing access to shade if the alternative procedures provide equivalent protection. Cooling measures other than shade (e.g., use of misting machines) may be provided in lieu of shade if the company can demonstrate that these measures are at least as effective as shade in allowing employees to cool.

Shade shall be available when the temperature does not exceed 80 degrees Fahrenheit provided through shade as per subsection (d)(1) or provide timely access to shade upon an employee's request.

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HIGH-HEAT

When the temperature equals or exceeds 95 degrees Fahrenheit. These procedures shall include the following to the extent practicable:

- Ensuring that effective communication by voice, observation, or electronic means is maintained so that employees at the work site can contact a supervisor when necessary. An electronic device, such as a cell phone or text messaging device, may be used for this purpose only if reception in the area is reliable.
- Observing employees for alertness and signs or symptoms of heat illness. The employer shall ensure effective employee observation/monitoring by implementing one or more of the following:
 - Supervisor or designee observation of 20 or fewer employees
 - Mandatory buddy system
 - Regular communication with sole employee such as by radio or cellular phone
 - Other effective means of observation
- Designating one or more employees on each worksite as authorized to call for emergency medical services, and allowing other employees to call for emergency services when no designated employee is available.
- Reminding employees throughout the work shift to drink plenty of water.
- Pre-shift meetings before the commencement of work to review the high heat procedures, encourage employees to drink plenty of water, and remind employees of their right to take a cool-down rest when necessary.

BODY REACTION TO HEAT

Four environmental factors affect the amount of stress a person faces in a hot environment - temperature, humidity, radiant heat (such as from the sun or a furnace) and air velocity. The level of heat stress a person experiences is also related to personal characteristics such as age, weight, medical condition, and acclimatization to the heat.

Risk may increase if a person is:

- chronically ill
- over 40
- returning to work from vacation
- overweight or in poor physical condition
- on a severely restricted diet
- recovering from a recent illness, including a heat related illness
- dehydrated
- living in high temperatures at night (no recovery time)
- experiencing a fever

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Other personal factors that increase a persons' risk of heat stress include:

- consumption of alcohol (within 24 hours)
- consumption of caffeinated and sugary drinks
- use of medications for:
 - high blood pressure
 - diuretics
 - antidepressants
 - tranquilizers
 - antihistamines (allergy and cold medications)
- recent illnesses
- recent vaccinations
- skin trauma, including sunburn

In general, the body reacts to hot environments as follows. When the blood temperature rises above 98.6°F, blood flow to skin increases to transfer heat to outside air through convection, radiation, evaporation, and conduction; and sweating occurs so its evaporation will cool skin, but reaches maximum efficiency at 86°F. Sweating is effective only if the humidity level is low enough to permit evaporation and if the fluids lost are adequately replaced.

If the body cannot dispose of excess heat, it will store it. When this happens, the body's core temperature begins to rise and the heart rate increases. Because so much blood goes to the external skin surface, less blood is supplied to the active muscles. Strength declines and the onset of fatigue comes quicker and results in reduced accuracy, comprehension, and retention. As the body continues to store heat, the individual begins to lose concentration and has difficulty focusing on a task, may become irritable and loses the desire to drink. The next stage is most often fainting and then possibly death if the person is not removed from the heat.

HEAT DISORDERS

There are five major categories of heat related illness: heat stroke, heat exhaustion, heat cramps, heat syncope (fainting), and heat rash (prickly heat). After experiencing a heat-related illness, the victim will be more susceptible to heat stress than before being affected. The symptoms and treatment of each is discussed below.

Heat Stroke

Heat stroke is the most serious heat related illness. It is always life threatening because a person's temperature is so high it might cause brain damage or organ failure. It is caused by the failure of body's temperature regulating mechanisms and dehydration.

Symptoms

- hot, dry skin (may be mottled, red or bluish),
- core temperature over 105°F,
- mental confusion, loss of consciousness, or
- convulsions or coma.

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Treatment

- Call for help immediately. Prompt first aid can prevent permanent injury to the brain and other vital organs.
- Remove the victim from heat and/or sun.
- Immediately cool victim with ice packs, cool water, cool compresses, (but never put ice directly on the skin).
- Do not give the victim anything to drink, especially not tea, coffee, or alcoholic beverages. Never give anything by mouth to someone who is unconscious.

Heat Exhaustion

Heat exhaustion is caused by the loss of body fluid and salt from sweating, decreased blood circulation to the brain and organs, or both. It is caused when a person does not take in enough water, salt, or both. It is less serious than heat stroke, but can become serious and lead to heat stroke if not treated.

Symptoms

- clammy, pale or flushed moist skin,
- extreme fatigue, headache, nausea,
- rapid pulse and low blood pressure, or
- oral temperature that is normal or slightly elevated.

Treatment

- Remove the victim to a cooler area and give them water as they desire (but never any liquids with caffeine or alcohol). "Sports" drinks may be consumed if desired, or slightly salted water (only if not on a restricted diet). "Slightly salted" means 1/4 teaspoon of salt per gallon of water.
- Have the victim rest with their feet slightly elevated.
- Cool the body with ice packs or cool water if needed.
- Call the appropriate emergency response number if the victim becomes unconscious.
- Some cases of heat exhaustion may take several days or longer for full recovery and the person is at higher risk of heat stroke after experiencing heat exhaustion.

Heat Cramps

Heat cramps are painful spasms of the working muscles of workers who are drinking large quantities of water, but have some salt depletion. The cramps may occur during or after working hours and are usually relieved by drinking lightly salted water.

Symptoms

Symptoms may include painful spasms of muscles used during work (usually arms, legs, or abdomen).

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Treatment

- Drink lightly salted water or "sports" drinks (unless on medical restriction).
- Use adequate salt amount during meals.

Fainting or Heat Syncope

Syncope may occur in workers who are not acclimated and stand still in the heat. Blood normally circulated to the heart and brain is sent to the skin for cooling, and pools in the enlarged blood vessels in the skin and in the lower part of the body. It may be prevented by moving around, assuming no other complications occur.

Symptoms

Symptoms may include fainting or becoming dizzy while standing in the heat.

Treatment

- Remove the victim to a cooler area and let them drink water.
- Recovery should be prompt.
- Consult a physician if the condition persists.

Heat Rash

Heat rash can be avoided by resting in a cool place and allowing the skin to dry. Also, wearing layers of thin cotton clothing that do not tightly bind the skin, especially near the waist or the arms, will allow sweat to evaporate.

Symptoms

"Prickly heat" may occur in humid environments where sweat is not easily removed from the skin by evaporation. The sweat ducts become plugged, become inflamed, and a rash develops. Infection is a possibility. When extensive or complicated by infection, heat rash can be so uncomfortable that it impedes a person's performance or even results in a total temporary disability.

Treatment

Cool and dry the skin and avoid conditions that cause sweating. If infection develops, have it treated by a physician.

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PREVENTING HEAT STRESS

Acclimatization

All employees shall be closely observed by a supervisor or designee during a heat wave. A "heat wave" means any day in which the predicted high temperature for the day will be at least 80 degrees Fahrenheit and at least ten degrees Fahrenheit higher than the average high daily temperature in the preceding five days.

An employee who has been newly assigned to a high heat area shall be closely observed by a supervisor or designee for the first 14 days of the employee's employment.

Acclimation is a process by which the physiological processes of a worker's body adjusts to the environment over a period of time, usually 5 to 7 days according to OSHA. However, the process may take up to three weeks depending on the individual and his/her work environment. According to the American Industrial Hygiene Association, the process requires a consistent work level for at least two hours each day during the acclimation period in order for a worker to become acclimatized. Mere exposure to heat does not confer acclimatization, nor does acclimatization at one heat stress level confer resistance to heat stress at a higher temperature or more vigorous work load.

The allowable WBGT-TLV exposure for workers not acclimatized is several degrees lower than that of someone who is fully acclimatized. Because their exposure to heat and their workloads may be inconsistent, some personnel may not, by definition, be acclimated to the heat they encounter in their shops. People who are not sufficiently acclimatized to the heat may experience transient heat fatigue resulting in a decline in performance, coordination or alertness. They may also become irritable or depressed. This can be prevented through gradual adjustment to the hot environment. People in good physical condition tend to acclimatize better because their cardiovascular systems respond better.

Allow the body to adjust to the hot environment. Sweat will increase, but salt loss will decrease. On the first day in a hot environment, a person should perform about 50% of the normal workload. The workload in the hot environment should be increased by 10% each day on each succeeding day. Full acclimatization takes about two weeks. It is the supervisor's responsibility to extend rest periods according to individual requirements and to allow a re-acclimatization period after an absence from work of a week or more or if the person is returning to work from an illness.

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Dehydration

Dehydration is a major factor in most heat disorders. The average body loses approximately 2½ quarts of sweat a day. When performing strenuous work, the body can lose up to 1½ quarts of sweat per hour. It is essential to drink more than is needed to satisfy thirst. It is necessary to drink 10-12 ounces of water every 20-30 minutes for heavy sweating.

Salt Replacement

Sweat not only contains water, but salt and other electrolytes. The body needs a certain amount of salt to function properly, but salt tablets are not recommended because of stomach irritation, nausea, and vomiting. Employees should drink normal water throughout day, but may drink an electrolyte solution such as Gatorade after working in a hot environment, if desired. Individuals on a salt restricted diet or those persons being treated for high blood pressure or heart problems must NOT try to replace salt without the advice of their physician.

Safe Work Practices

Watch out for the safety of coworkers. Take scheduled breaks in cool areas. Take water breaks as needed. Drink plenty of cool water. Report trouble to a supervisor. Supervisors should consider scheduling the hottest work for the coolest part of day, assigning extra workers to high demand tasks, and using a wide variety of work-saving devices such as power tools, hoists, cranes, or other lifting aids to reduce the body's work load.

Supervisors must ensure personal factors that contribute to heat related illness are taken into consideration before assigning a task where there is the possibility of a heat-related illness occurring. The most common personal factors that can contribute to heat related illness are age, weight/fitness, drug/alcohol use, prior heat-related illness, etc.

RECOMMENDED PROTECTIVE CLOTHING

Loose fitting clothes made of light cotton allow sweat to evaporate and transfer heat better than tight fitting synthetic fibers. Wear a hat to shade the head.

THINGS TO AVOID

The following should be avoided while working in hot environments:

- all alcoholic beverages
- diuretics, or water pills
- hot, heavy meals
- sugary drinks
- severely restricted diet

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EMERGENCY RESPONSE

Midland Engineering Co., Inc. will ensure that effective communication by voice, observation, or electronic means is maintained so that employees at the work site can contact a supervisor or emergency medical services when necessary. An electronic device, such as a cell phone may be used for this purpose only if reception in the area is reliable. If an electronic device will not furnish reliable communication in the work area, the company will ensure a means of summoning emergency medical services.

Midland Engineering Co., Inc. will respond to signs and symptoms of possible heat illness, including but not limited to first aid measures and how emergency medical services will be provided.

- If a supervisor observes, or any employee reports, any signs or symptoms of heat illness in any employee, the supervisor shall take immediate action commensurate with the severity of the illness.
- If the signs or symptoms are indicators of severe heat illness the company must implement emergency response procedures.
- An employee exhibiting signs or symptoms of heat illness shall be monitored and shall not be left alone or sent home without being offered onsite first aid and/or being provided with emergency medical services.

Midland Engineering Co., Inc. will contact emergency medical services and, if necessary, transport employees to a place where they can be reached by an emergency medical provider. In the event of emergency, clear and precise directions to the work site can and will be provided as needed to emergency responders.

TRAINING

All employees will be trained on Heat Illness Prevention procedures. Prior to the supervision of workers, supervisors will be trained in the company's procedures for heat illness prevention, procedures to be followed when an employee exhibits symptoms of heat illness, and emergency response procedures.