Infrastructure Works for Riyadh SEDRA Project Phase-3

Adverse Weather Condition Working Plan

00103-CHE-PLN-HSE-000008

REV. 01

September-08-2024

فرع شركة شاينا هاربور إنجينيرنج كمبني ليمتد
BRANCH OF CHINA HARBOUR ENGINEERING CO., LTD.
中国港湾工程有限责任公司沙特分公司

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Rev No.	Date	Prepared By	Reviewed By	Approved By	Remarks

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Contents

1 INTRODUCTION

1.1 Purpose

The purpose of this Plan is to establish safety and health requirements in order to prevent injury and Suffering from the effects of adverse weather to any person in the Project, by implementing measures that reduce/eliminate the risk of adverse weather.

1.2 Scope/ Applicability

This Plan is applicable for all Contractor and Subcontractors personnel involved in the project, as well visitors and other Stakeholders.

2 DEFINITIONS

For a comprehensive list of definitions for the terms and abbreviations used at ROSHN, see the List of Definitions and Abbreviations.

2.1 Terms and Definitions

Table 1: List of Terms and Definitions

Term	Definition

Project	Infrastructure works for Riyadh SEDRA Phase 3.
Client/Employer	ROSHN
Engineer/PMC	East Consulting Engineering Company
Principal Contractor	CHEC (China Harbour Engineering Company)
Accountable Person	An individual, who assumes responsibility for the health and welfare of any other person in a workplace by providing instruction, direction, assistance, advice or service, is deemed an accountable person. All management and supervisory staff are therefore considered “Accountable Persons”
Competent Person	One who has acquired knowledge and skills to correctly perform a specified task, through a combination of training, education, and experience.
Qualified Person	One who, by possession of a recognized degree, certificate, professional standing or by extensive knowledge, training, and experience, has successfully demonstrated ability to solve or resolve problems relating to the subject matter, the work, or the project.
Rated Capacity	The maximum mass (in kg or tons) which may be handled by a crane at a specific working radius (in meters) and a specific boom or jib length without the strength or stability requirements being exceeded. The rated capacity shall comprise the mass of the lifted load and lifting attachment and the mass of the hook block in use
Rigger	A certified worker who conducts rigging works
Rigging Works	Work involving the use of mechanical load shifting equipment and associated gear to move, place or secure a load including plant, equipment, or members of a structure to ensure the stability of those members. It also includes the setting up or dismantling of cranes or hoists, the application of slinging techniques, including the selection and inspection of lifting gear, safely slinging a load, and directing a plant operator in the movement of a load when the load is out of the operator’s view
Routine Lift	Lifts that will require the lift to be planned and conducted by a suitably qualified rigger but are not critical lifts. The lift must be planned and documented on a PTW identifying all lift planning requirements
Safe Working Load (SWL)	The maximum load that an item of lifting equipment may raise, lower or suspend under particular service conditions. It is the SWL that is marked on the item and that appears on any examination report or test records

2.2 Abbreviations

Table 2: List of Abbreviations

Term	Definition
ERT	Emergency Response Team
FAI	First Aid Injury
HIRARC	Hazard Identification, Risk Assessment and Risk Control
HSAS	Health and Safety Assurance Standards
HSP	Health and Safety Plan
JSA	Job Safety Analysis
KSA	Kingdom of Saudi Arabia
LTI	Lost Time Incident
LWDC	Lost Work Day Case
MTC	Medical Treatment Case
OSH	Occupational Safety and Health Discipline
OSHM	OSH Manager
OSHMS	Occupational Safety and Health Safety Management System
PMC	ECEC (the Engineer)
MEWP	Man Elevated Working Platform
PPE	Personal Protective Equipment
TWL	Thermal Work Limit
RAMS	Risk Assessment and Method Statement
Sub Con – S/C	Subcontractor
TBT	Toolbox Talk

3 REFERENCES

3.1 ROSHN Documents

Table 3: List of Applicable ROSHN Documents

Document no.	Document title
RRE-HC-HC1-A00-NSP-RRE-HSE-MAN-00001	HSSE Requirements for Contractors
RRE-HC-HC1-A00-NSP-RRE-HSE-PRO-00006	Hot & Cold Injuries
RRE-HC-HC1-A00-NSP-RRE-HSE-PRO-00004	Construction Site Welfare

3.2 Other Documents

Table 4: List of Applicable National and International Standards and Regulations.

Document no.	Document title
Royal decree N051 of 2005	Labor Law Part 8 – Protection against Occupational Hazards
Decision No. 1982/2016	Labor Law implementing new regulations
Decision No. 3337:2014	Summer Working Hours
ISO 45001:2018	OHS Management Systems – Requirements

4 ROLES AND RESPONSIBILITIES

4.1 Project Director

- Overall responsibility for the implementation of this Plan;
- Determination, approval and availability of the budget including provision of all necessary Resources required for the implementation.

4.2 Health and Safety Manager

- Review all sites and potential adverse weather hazards associated with activities and worksites, to support and facilitate the risk assessment process and control programs;
- Ensure the hazards and related mitigation are communicated to all employees;
- Ensure monitoring of weather conditions and communicate findings to all personnel;
- Ensure adequate medical treatment is available in case of medical emergencies.

4.3 Construction Director

- Overall accountability to ensure that the work activities comply with the requirements of the local legislation (i.e. “mid-day ban”) and those set forth in this Plan;
- Support Construction teams in the implementation of the requirements of the Plan.

4.4 Construction/Site Managers

- Implementation of this Plan and provide all necessary requirements to the workers;

- Ensure that all personnel, including those of subcontractors under their control are not working in conditions that are likely to expose them to adverse weather;
- Ensure rest breaks are granted to employees when weather and work conditions require so;
- Ensure adequate shaded rest shelters are available for employees;
- Ensure adequate cool drinking water is available at each workplace;
- Monitor their workforce during periods of high temperature for signs of heat-related symptoms and take immediate action when necessary;
- Never require/allow an employee who is physically unfit to work in a hot environment;
- Plan work schedules to help employees to adapt to the heat for better acclimatization;

4.5 All Personnel

- Attend required training and awareness programs;
- Follow all the instructions and requirements they are made aware of.

5 ADVERSE WEATHER CONDITIONS

The below listed weather conditions are the conditions which are hazards for work and chances of Injuries and damages are increased on project site:

- Hot Weather;
- High/Strong winds;
- Sandstorms;
- Heavy Rain and Flash Flood;
- Thunderstorms;
- Cold Weather.

In worst case scenario, the workers must be sent back to camp after such decision is taken from the Construction Director or directly by the Project Director.

When the weather condition improves, the following items must be inspected by competent persons Before deploying the workers back to site:

- Site routes, access/egress points, fencing and hoardings;
- Cranes and hoists;
- Electrical DB's and cables must be checked by electrician to identify any damages;
- Loose materials on the edges must be removed or secured again;
- Scaffold structures must be inspected, and loose parts must be tightened;
- Excavation edges must be inspected to ensure that the areas are safe to work.

6 HOT WEATHER

Summer months can reach temperatures over 50oC together with high levels of humidity, endangering those exposed. Some of the many factors that affect body temperature and expose to heat stress-related illnesses are listed below:

- Lack of proper fluid replacement;
- Extreme air temperature;

- Lack of air movement – oven effect;
- Reflected heat or sunrays;
- Being under the direct sunlight;
- Convection of heat through walls or steel;
- Prolonged or strenuous activities;
- High humidity;
- Medications, diet, excess salt intake;
- Physical fitness (lack of, weight, acclimatization;
- Excessive or layered clothing.

The exposure to (extremely) hot weather may lead to heat stress and related illnesses, which include:

- Heat Stroke/Sunstroke;
- Heat Exhaustion;
- Heat Syncope;
- Heat Cramps;
- Heat Rash (Prickly Heat);
- Dehydration.

Some of the above are conditions which are extremely dangerous and may lead to fatal consequences or permanent conditions affecting the person. Therefore, symptoms and related response measures for each conditions shall be taken into careful consideration and personnel made aware accordingly.

The next sub-paragraphs highlight for each of this conditions:

- Causes;
- Symptoms;
- First aid measures;
- Prevention measures.

6.1 Heat Stress Symptoms and Response

The next tables show the measures to be undertaken under different scenario related to heat stress related illnesses and malaises.

HEAT STROKE (SUNSTROKE)
CAUSE: Partial to complete failure of sweating mechanism, body is unable to cool down.
SYMPTOMS: 1. Hot, dry skin (no sweating) 2. Confusion or Dizziness 3. Chills or Convulsions

4. High body temperature greater than 40 degrees Celsius
5. Throbbing Headache
6. Slurred Speech

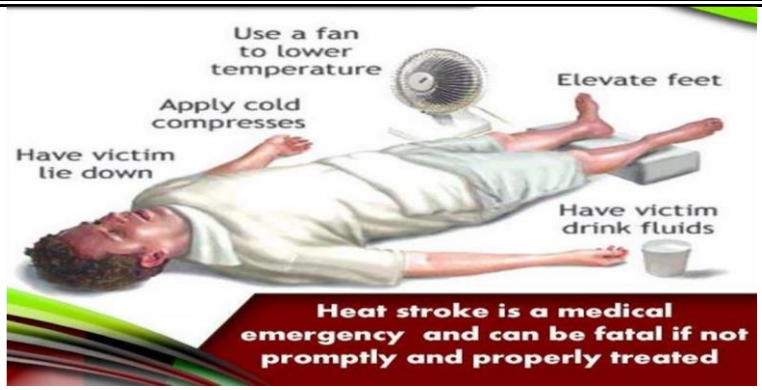
FIRST AID: MEDICAL EMERGENCY!

Take the following steps to treat a worker with heat stroke:

1. Call on site emergency number and notify Site Nurse, OSH Officer and Supervisor and for immediate medical transport to nearest hospital or medical centre.
2. Move the employee to the cool shaded area; start the cooling immediately.
3. Cool the worker using the methods such as:
   a) Soaking their clothes with water.
   b) Spraying, sponging, or showering them with water.
   c) Fanning their body;
   d) Applied cold compress on the heat pressure point of the body.

PREVENTION:

1. Acclimatization.
2. Close Monitoring for signs of heat illness.
3. Medical Screening.
4. Increase water intake.



HEAT EXHAUSTION

CAUSE: Dehydration (excessive loss of water and salt) causes blood volume to decrease

SYMPTOMS:

1. Diaphoresis or excessive sweating
2. Fatigue and weakness
3. Confusion and Dizziness
4. Nausea and Headache
5. Clammy and moist skin
6. Pale and flushed complexion
7. Slight elevated body temperature
8. Fast and shallow breathing.
9. Rapid Pulse
10. Faintness

FIRST AID:

Treat a worker suffering from heat exhaustion with the following:

1. Have them rest in a cool, shaded or air-conditioned area.
2. If conscious, give them plenty of water or other cool non-caffeinated beverages.
3. Render cool sponge bath.
4. Have them rest.

PREVENTION:

1. Acclimatization
2. Increase water intake.

HEAT SYNCOPE

CAUSE: also known as fainting episode or dizziness resulted from dehydration. It usually occurred in prolonged standing or sudden rising from a sitting or lying position. Dehydration causes the blood volume to decrease. Blood pools in dilated blood vessels of the skin and lower body, making less blood available to the brain.

SYMPTOMS:

1. Fainting while standing
2. Dizziness
3. Light-headedness

FIRST AID:

Workers with heat syncope must:

1. Sit or lie down in a cool place when they begin to feel symptoms.
2. Slowly drink water, clear juice, and avoid caffeinated beverages.
3. Notify the Chief Medical Officer, Site Nurse, Safety Officer, and Supervisor and for immediate medical transport to the nearest hospital or medical centre.

PREVENTION:

1. Acclimatization.
2. Drink plenty of water
3. Avoid standing in one place and intermittent activity to avoid blood pooling.

HEAT CRAMPS

CAUSE: It is due to a loss of sodium (salt) from sweating. Dehydration is a factor.

SYMPTOMS: Muscle Pain or Spasms usually in the abdomen, arms and legs

FIRST AID:

Workers with heat cramps must:

1. Stop all activity and sit in a cool place.
2. Drink clear juice and avoid caffeinated beverages.
3. Do not return to strenuous work for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke.
4. Seek medical attention if any of the following apply:
   a) The worker has cardiovascular (heart) problem.
   b) The worker is instructed on a low sodium diet.
   c) The cramps do not subside within one hour.

PREVENTION:

1. Drink plenty of water.
2. Take adequate salt every meal.

HEAT RASH (PRICKLY HEAT)

CAUSE: Skin is constantly wet from sweat. Sweat Glands ducts become plugged leading to inflammation.

SYMPTOMS:

1. Red cluster of small blisters more likely in the neck, upper chest, and groin.
2. Itchy and discomfort

FIRST AID:

1. Try work in a cooler, lee humid environment when possible.
2. Keep the affected the skin clean and dry.

PREVENTION:

1. Take a bath after work.
2. Keep the skin clean and dry.

DEHYDRATION

CAUSE: Occurs when loss of body fluids, mostly water, exceeds the amount taken in.

SYMPTOMS:

1. Extreme Thirst
2. Dry mouth and swollen tongue
3. Weakness
4. Dizziness
5. Palpitation
6. Decrease Urine Output
7. Confusion
8. Slow Skin Turgor

FIRST AID:

1. If conscious, give plenty of water to drink.
2. Give them an Oral Rehydrating Solution (O.R.S).
   a) 6 teaspoons of sugar
   b) ½ teaspoon of salt
   c) Mix and stir to a 1 liter of drinking water.
3. Give comfort measures

PREVENTION:

Instructed and encouraged the employees to drink water prior to work, and avoid drinking caffeinated beverages to avoid excretion of water in their body.

6.2 Working Hours

Working directly in the sun between 12:00pm and 03:00pm from 15 June to 15 September is strictly prohibited, in accordance with KSA Governmental Regulations. This includes also areas (enclosed

equipment and facilities included) under sunlight not provided with A/C to cool down the environment. CHEC will adjust its work schedule accordingly.

6.3 Workplace

All works location will be equipped with the following facilities:

- Cool water supply;
- First Aid Box;
- Rest Shelter.

The number of persons using the rest shelter at any one time will be determined by the calculation of 1.3m² per person. Seating must be provided for employees making use of the rest shelter. The rest shelter must have sufficient ventilation, including mechanical (i.e. desert fans) whenever practicable.

6.4 General Preventive Measures

Proactive measures shall address and prevent heat stress before it ever becomes a problem. Anticipate high heat days through weather forecasts and prepare proactively.

The following are a few recommendations to aid in the prevention of heat related problems:

- Provide/take rest breaks depending upon conditions such as air temperature, sun exposure, radiating heat exposure and hard physical work;
- Plan schedules to allow acclimatization of employees, in accordance with TWL Chart;
- Never require/allow an employee who is physically unfit to work in hot environment;
- Ensure adequate cool drinking water is available at each workplace. Sweet drinks such as canned soft drink should not be provided as these increase fluid losses;
- Re-hydrants (ORS) shall be readily available to all site workers;
- Encourage workers to drink water frequently as most persons may not feel how urgently their bodies need water;
- Ensure adequate medical treatment is available in case of medical emergencies due to heat stress. Supervisors must look for early signs of heat stress, relieve workers and ensure appropriate treatment is provided;
- The interior of a vehicle may not be used to provide shade unless the vehicle is air-conditioned, and the air-conditioner is adequately operating. Vehicles without operating A/C must be taken out of service until A/C is properly functioning;
- Alcohol consumption is strictly prohibited on site;
- Promote increase in sleeping hours for workers. Those who suffer sleep deprivation (full or partial) are less tolerant in hot environments due to reduced sweat rate, increased ratings of exertion and increased core temperature. Consequently, sleep deprivation has been discussed as a predisposing factor for heat-related illness;

- Workers will be encouraged to maintain a healthy diet, with emphasis on the consumption of vegetables and fruits. Workers staying at Company-managed Labor Camp(s) will be provided higher fruit intake with every meal;

- Rest breaks are used to reduce the metabolic heat produced by the body during heat and cooling aid. The work/rest cycle shall be in accordance with the heat index chart and flag system. Rest breaks ideally should be taken in a cool place;

- Air conditioning is a method of air cooling which uses a compressed refrigerant under pressure to remove the heat from the air. Provide recovery areas such as air-conditioned enclosures and rooms and provide intermittent rest periods with water breaks. Designated cold areas shall be provided with sitting arrangements for workers. Cooled area shall:

- Have sufficient number of tables and seats for the number of workers likely to use them at once;
- Have sufficient ventilation;
- Be kept clean and tidy;
- Not be used to store plant, equipment or materials;
- Have sufficient drinking water always available, clearly identified, and easy to get; - Personal (water flasks) or group (disposable cups) provided.

- Portable fans shall be provided to maintain general ventilation, increase heat exchange and rate of evaporation. Misting fans that produce a spray of fine water droplets shall be installed at different locations around the site;

- Workers shall be provided with heat protective clothing and equipment, loose lightweight clothing which encourages heat to be released, while covering most areas of the body to limit sun exposure;

- In night shift workers are not exposed to radiant heat but usually the environment is comparatively more humid than daytime. Supervisor will closely monitor the environment and the workers and ensure the implementation of corrective actions;

- While working in a hot environment workers can produce as much as 2-3 gallons of sweat. Therefore, replacement of these fluids should be equal to the amount of sweat produced. Each worker will be provided with portable water bottles to encourage them to drink small amounts frequently (i.e. one cup every 20 minutes).

6.5 Acclimatization

Employees who perform moderate work regularly in hot environments can develop a certain degree of tolerance for heat, which is called acclimatization. Site personnel need time for their body to adjust to work in heat. This “acclimatization” is particularly important for workers being absent from work (i.e. due to illness), new employees or those coming back from rotation (i.e. cool to hot climate) and in general those performing heavy duty.

In line with Employer’s requirements, acclimatization program for new employees, employees that have been on vacation, and employees that are moving from a worksite that has climate control to a worksite

that has high temperatures shall account for an allowance of 5-7 days for acclimatization before starting hard work in a hot environment. The TWL chart provided below can be used as a guide to determine the acclimatization and other arrangements.

TWL ($W.m^{-2}$)	Working zone	Interventions
> 220	Unrestricted	No limits on self-paced work for trained, hydrated workers
140-220	Acclimatisation	No restriction for acclimatised workers Workers with uncertain acclimatisation status should not work alone in this zone • Be aware of increased risk of heat illness • Dehydration test for first two shifts back from leave
115-140	Buffer	Buffer zone exists to identify situations in which environmental conditions may be limiting to work • Any practicable intervention to reduce heat stress should be implemented e.g. provide shade, improve ventilation, etc. • Working alone to be avoided if possible • Unacclimatised* workers not to work in this zone • Use the technical information sheets 'Work-rest cycling – sample schedules' and 'Fluid requirements for working in heat' to prescribe maximum exposure time, work/rest cycling and fluid intakes appropriate for type of work and conditions
< 115	Withdrawal	Work limited to essential maintenance or rescue operations • No person to work alone • No unacclimatised* person to work • Documentation required authorising work in hostile thermal conditions for specific purpose • Specific induction required emphasising hydration and identifying signs of heat strain • Apply 20 minutes work – 40 minutes rest schedule • Required fluid intake exceeds 600 mL per 30 minutes • Personal water bottle (2 litre capacity) must be on the job at all times • Mandatory dehydration testing at end of shift

* Note: unacclimatized workers are defined as new workers or those who have been off work for more than 14 days due to illness or leave (outside the tropics)

6.5.1 New Employees

The first step in managing heat stress is to determine if the new employee is used to working in the heat. A person who is not used to working in high heat conditions cannot be expected to perform, as an acclimatize employee would be able to perform.

The new employee will be introduced to the new environment carefully. The tasks assigned will consider the persons abilities, strength, and acclimatization. Prolonged strenuous activity or exposure to extreme heat will be limited by rotating employees until all are accustomed to the new environment. A normal acclimatization process takes 2-3 weeks to complete before the employee is comfortable working in high heat environments.

Health and physical assessment programs will be conducted to the employees to ensure they are fit for the work in hot weather. If any employee will be identified with heat illness, the nurse will take necessary action to prevent further deterioration. Tracking register will be maintained by the nurse to track the employees those required re-surveillance.

The Supervisors are the essential persons to provide an acceptable acclimatization period with appropriate tasks to ensure the safety of the new employees. Several factors will give a Supervisor clues as to whether a new employee will acclimatize quickly or not:

Physical Fitness: a fit person will generally have a higher tolerance and acclimatize sooner;

Previous Experience: someone who has worked in a high heat environment either will be acclimatized or will have a better knowledge of how to acclimatize him;

Fluid Intake/Breaks: a person who works steady with regular breaks will acclimatize quicker than someone who will takes sporadic and more frequent breaks;

Attitude: a new employee who is eager and not worried about working in the heat will acclimatize more quickly than someone who is anxious when working in hot environments. Care will be taken with employees because they may push himself too much and too quickly

6.5.2 Current Employees

This group is generally more susceptible to heat stress than some of the new employees. These employees are already acclimatized and feel that they are able to “handle the heat” or they are introduced to heat for the first time of the season and feel that they are fine when, in fact, they are not.

Most feel that they can do more than they really are able to do, or are trying to complete a task before taking their break. Sometimes the experienced employee is trying to show the new employee “how to do it” and is caught doing more than he should.

Awareness and education is the tool to keep the current employee out of trouble.

6.6 Heat Stress Index Monitoring

OSH Team Member will utilize a calibrated digital monitoring device that gives a direct readout of the Temperature, Humidity, and the Heat Stress Index. Readings will be taken hourly and recorded on the pro-forma sheet.

Readings will be taken at representative locations at the site where differing work activities, work groups or specific location may provide different readings (i.e. there may be a humidity differential between the surface and inside the buildings).

Site Supervisors will monitor (visual, verbal) the physical and mental health of their Team. They shall furthermore ensure no lone working is assigned during heat period. Additionally, the workforce will self-monitor themselves and their colleagues (buddy system) and report any potential issues to the Site Supervisor, OSH Team or First Aider.

Medical Staff will determine if specific or extra monitoring of employees (i.e. blood pressure, heart rate, oral temperature, body water loss, etc.) is necessary and will implement it.

6.6.1 Flag System

A system of Heat Stress Index Warning Flags will be utilized to give a visual indication on the Heat Stress Index range and associated relative risk:

- **Red Flag** – All works are to be stopped once the heat index reaches 54 or higher (Heat stroke / sun stroke highly likely with continued exposure). Under such conditions all works, with the exception of any Emergency Response activities are to cease until such circumstances drop to a Heat Stress Index below 54. Any Emergency Situation works will require to be discussed.
- **Orange Flag** – Raised where Heat Stress Index is in range 41-53. An Orange flag situation indicates a state of "works may proceed but with caution" (Sun stroke, heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/ or physical activity). Appropriate control measure will need to be applied with a proactive watching brief not only on potential escalating Heat Stress Index values but also on increased surveillance of workers displaying potential heat stress illness traits.
- **Yellow Flag** – Raised where Heat Stress Index is in range 33 - 40. Yellow flag situation indicates a state of "works may proceed but with caution" (Sun stroke, heat cramps and heat exhaustion possible with prolonged exposure and/ or physical activity). Appropriate control measures will need to be applied with a proactive watching brief not only on potential escalating Heat Stress Index values but also on increased surveillance of workers displaying potential heat stress illness traits.
- **Green Flag** – Raised where Heat Stress Index is in range 24-32. A green flag situation does not indicate a "safe" (Fatigue possible with prolonged exposure and/ or physical activity) thermal environment however it does indicate that the associated risk conditions can be considered acceptable but should continue to be monitored to ensure they do not escalate.

Associated flag poles shall be high enough that they can be seen above surrounding structures and shall be posted at multiple locations to ensure visibility from all locales. Signs/posters will be posted around the sites as a reminder of what the flag status means.

6.6.2 Apparent Temperature

The apparent temperature is the combined index of heat and humidity, or what it really feels like to the body. Using the apparent temperature as a guide, prevention measures are enacted when specified apparent temperatures are reached, through three different stages.

Table 4: Apparent Temperature Chart

Actions	32° - 35°C Level One	36° - 40°C Level Two	41° - 46°C Level Three
Water Intake	1-2 cups each 20-30 min	2-4 cups each 15-25 min	4-6 cups each 15-20 min

Breaks frequent	1-2 min. water, plus 15-20 min Cool breaks, down shade/Fan.	1-2 min. water, plus 15-20 min Cool breaks, down shade/Fan.	1-2 min. water, plus 15-20 min Cool breaks, down shade/Fan.
Fluid Supplies	Begin to provide electrolyte solution	Provide electrolyte solution and more than adequate supply of water	Provide more adequate water and electrolyte. Encourage frequent breaks

6.7 Fluids Intake

High apparent temperatures can cause the body to lose large amounts of fluid through sweating. This fluid loss will be replaced to maintain normal bodily functions. Electrolyte solutions are beneficial in the fight against heat stress. However, water remains the essential ingredient and the worker should never drink more electrolytes than water. A good rule of thumb is to drink 2-3 glasses of water to one glass of electrolyte solution. To replenish lost electrolytes, workers will be provided with electrolyte packets every day and they shall be advised on the correct intake.

Record shall be maintained for packets provided to the workers. The distribution shall be controlled with a combined effort from the site First Aid Station and OSH Officers. The amounts depend on the number of gang members and their type of work.

ORS must be taken, during extreme heat and humidity conditions, as follows:

- Temperatures 40°C-46°C and humidity 65%-84%: 200 ml twice per shift (at beginning of shift i.e. 9H00 for day shift – within 2 – 3 hours after start of shift and then after the midday break);
- Temperatures > 46°C and humidity >84% - 300 ml, twice per shift (at the beginning of the shift i.e., 9H00 for day shift – within 2 – 3 hours after start of shift and then after midday break);
- Re-hydrant is to be administered during day and night shift operations;
- The use of Re-hydrant DOES NOT substitute for the intake of water and thus water consumption shall continue as normal throughout the shift. (Every 45min – 1 hour);
- Electrolytes distribution shall include also Subcontractors' employees. Either their Companies will distribute the electrolytes to them and shall provide a daily report to WSS for auditing purposes, otherwise WSS will distribute the re-hydrants to them;
- The Supervisor/Foreman must include in their daily activity briefing and TBT discussions the safe use and disciplined use of re-hydrant.

6.8 Health Surveillance

Pre-existing conditions such as hypertension, physical fitness, heart diseases, diabetes or any other health condition may affect the heat sensitivity shall be considered when assigning the employees to heavy duties in hot environment. HR shall inform Construction Managers and OSH Manager of persons at-risk according to results of pre-employment and periodical fit-to-work medical visits, in

order to know personnel needed for re-assignment. In addition, the aforementioned factors shall be considered during treatment if a person suffered heat exhaustion.

6.9 Protective Clothing

Workers shall be provided with heat protective clothing and equipment, loose lightweight clothing which encourages heat to be released and covers most areas of the body and limits sun exposure and the contractor will provide shaded shelters for all workers on the site.

6.10 Training and Awareness

6.10.1 Workers

The prevention of heat stress and heat-related illness begins with educating supervisors and employees on the risk of working in hot environments. Heat Illness prevention training will be given to all workers including information on symptoms and site arrangements for risk control. Heat stress training shall aim to increase employee's recognition of the safety and health hazards of working in high heat, factors that increase the risk of heat-related illness; signs and symptoms of heat illness, and first aid and preventive measures that decrease the risk of heat-related illness. Site Managers / Supervisors shall ensure employees who may be exposed to hot environments are trained in this procedure prior to work. Safety poster to be fixed on rest areas, mess hall etc. Urine colour chart for self-monitoring should be placed on toilets. Safety talks should be conducted to operatives every season as a refresher session.

6.10.2 Supervisors

Supervisors shall be provided with training highlighting their role and responsibility in handling the heat stress. Supervisor shall ensure that the Heat stress start card is completed before commencing any activity. They shall be able to access activities having heat stress potential due to the physical demand or the ambient environment conditions. After evaluating the risk, he shall be able to implement control measures such as job rotation, enough rest breaks. Supervisor awareness training shall address: Their role and responsibility;

- Heat index;
- Work/ Rest Cycle;
- Scheduling breaks strategy;
- Providing enough shade and water;
- Monitoring workers for signs and symptoms of heat illness;
- Emergency procedure.

6.10.3 Medical Staff and First Aiders

Awareness training will be provided to first aiders and nurses to prepare them for expected emergencies and Specific First Aid/Medical Equipment for Heat related illness.

6.10.4 Heat Stress Campaigns

CHEC will conduct Heat illness related campaign to keep workers safe and what workers need to know – including factors for heat illness, adapting to working in indoor and outdoor heat, protecting- workers, recognizing symptoms, and first aid training.

A heat stress campaign shall be properly planned and designed with the objective of improving the employees' perception and safety culture.

Hazard based campaign shall include but not limited to:

- Place posters in workplaces to raise awareness of safety;
- Update work health and safety procedures;
- Provide refresher safety training;
- Conduct demonstration;
- Emergency mock drills.

7 HIGH/STRONG WINDS

In the event where the wind speed is above 38 Km/h all the lifting works will be suspended, other external works must be ensured by the concerned supervisors that that it is safe to continue. Otherwise, the activities will be ceased till wind normalizes to safe working condition.

All the materials must be secured as they can be blown away by the wind, injuring someone or damaging equipment. Appropriate materials will be made available on the project to facilitate in securing the property, materials and equipment.

Crane operations shall be suspended with wind speeds of 38 to 45 km/h and more. However, operators are authorized to suspend operations if he cannot maintain full control of the load even before the wind speed reaches 38 to 45 km/h. Strong winds may swing suspended loads (crates, panels, etc.) out of balance and radius, making the crane/lifting unstable.

Although the storm may have passed, hazards may still exist because of unstable structures or other hazardous conditions. Therefore, a safety and property damage assessment will be conducted by the Construction team and passed to the OSH team on site, for planned clean up prior to the start-up of normal construction activities.

The following measures shall be implemented:

- Reassign work and area;
- Properly store and secure the materials;
- Lower/tie down crane booms, also giving consideration to the recommendations of the manufacturer for securing the crane;
- De-energize all unnecessary electrical power supply;
- Check all mobile equipment for stability and set the brakes.
- Ensure no materials are stored near edges/openings;
- Ensure no loose materials are left uncontrolled;
- All work at height to be suspended during high winds;

- Ensure that any scaffolds and mobile towers are adequately secured and tied;
- Ensure compound/site boundary fencing is securely erected in accordance with manufacturer's recommendations and any approvals.
- Ensure that barriers/signage are adequately secured.
- Ensure adequate arrangements are in place to secure any loose materials which may become projectiles, whether at ground level and or at height.
- Remind personnel of their designated smoking areas and ensure that cigarettes are properly put out to prevent it from igniting fires.
- Ensure a site inspection is undertaken before operatives are permitted to return to work.

7.1 WIND SAFETY WHEN WORKING AT HEIGHT: THE DO'S & DON'TS

Powered access platforms, such as cherry pickers and scissor lifts, are safer alternatives for working at height than using a ladder. Whether working on general maintenance or warehouse builds, you may find yourself exposed to variable weather conditions with the wind causing significant issues. Access platforms can provide a broader range of mobility to complete tasks above ground level, whilst also ensuring health and safety regulations are met and people are kept safe.
In this blog, Horizon Platforms looks at how in windy conditions working at height can become unsafe, requiring further safety precautions to reduce risk. To avoid both harm to yourself and others, causing damage to your machine, or breaking rules and regulations, follow this important advice.

WHAT IS A MEWP'S MAXIMUM WIND SPEED?

All MEWPs designed for outdoor use have a maximum wind speed at which it's safe to operate, usually 28 mph or 12.5 ms (Beaufort scale 6). Regulations state that this information should be clearly labelled on the equipment, and the wind speed limit can often be found on the manufacturer's data plate on the platform's base, as well as in the operator manual. For access platforms designed for indoor use, the maximum safe operating wind speed will be zero, as this equipment is strictly for indoor operation only and using it outside would seriously compromise its stability and safety.

Whenever you operate a cherry picker or scissor lift outdoors, it's best to exercise plenty of caution and carefully assess the potential level of danger in windy conditions. The Health and Safety Executive (HSE) states that if the wind speed is above 23 MPH (10.3 ms or Beaufort scale 5), it's likely that a worker's balance will be affected.

However, there are multiple factors to consider, such as the restrictions and limitations of the machine itself and the height you need to operate at. Keep in mind that the wind gets stronger as you get higher, and the wind chill factor will also increase. This means that on a day with an ambient temperature of 10°C and a wind speed of 20 mph (9 ms), an operator's hands and face can experience wind chill of 0°C.

Always check a MEWP's user manual and machine decals for guidance on maximum safe operating wind speeds, and check the wind speed from the platform with an anemometer or against the Beaufort scale before use.

BEAUFORT SCALE FOR ASSESSING WIND SPEED

Beaufort number	Wind speed (mph)	Description	Wind Effects on Land
0	<1	Calm	Calm. Smoke rises vertically
1	1-3	Light Air	Wind motion visible in smoke drift
2	4-7	Light Breeze	Wind can be felt on skin, leaves rustle
3	8-12	Gentle Breeze	Leaves and small twigs on trees in constant motion
4	13-18	Moderate Breeze	Dust and loose paper raised. Small branches in motion
5	19-24	Fresh Breeze	Smaller trees begin to sway
6	25-31	Strong Breeze	Large branches in motion. Whistling can be heard in overhead wires. Umbrellas become hard to use

STAY SAFE WHEN WORKING AT HEIGHT IN WINDY CONDITIONS

One of the most important steps to take when carrying out work at height in any weather conditions is a pre-work risk assessment. This should include not only an assessment of your MEWP and its condition but a thorough inspection of your working environment. When working at height, the weather is just as important as the ground you are working on, meaning you'll need a sturdy surface to begin the work and suitable conditions to be able to complete tasks safely.
Make use of an anemometer to accurately check the wind speed, and consider other conditions such as where your MEWP will be set up. For example, being near a large building could mean stronger gusts, or being between two buildings, or inside large building erections where walls or windows may be missing, could create a wind tunnel effect.
Also keep in mind that wind speed is rarely constant, and sudden gusts can exceed the safe maximum operating limit as well as take an operator by surprise.
Even if it is deemed safe to work at height in windy or any weather conditions or indoors for that matter, you should always have a rescue plan in place. Never operate a MEWP in any circumstances without a rescue plan.

AVOID OBJECTS FALLING FROM ACCESS PLATFORMS AT ALL COSTS

A crucial part of the risk assessment should cover which pieces of equipment and items you'll need to use whilst working at height. This means you can accurately review which pieces will need to be fastened down, attached to your body or secured to the MEWP. This will prevent the wind from blowing it off the platform and keep those around you safe from falling objects.
This also applies to your environment, meaning that you should avoid working around objects which aren't secure when wind speeds are high. Panels, tiles, piping and other objects on buildings can all create hazards if they become disturbed by high wind speeds.

THE SAIL EFFECT OF WIND ON OBJECTS

Another risk for working at height in windy conditions is the 'sail effect'. This is when an object with a large surface area – such as cladding materials, sheets, and panels – can act as a sail when caught by gusts of wind. This effect can make these materials much more difficult to handle safely at height, as well as greatly impacting the stability of the access platform.
It's an important factor to take into consideration when handling these types of objects in windy conditions, especially when a MEWP is involved.

8 Sandstorms

Dust particles vary in size from course (non-inhalable), to fine (inhalable), to very fine (breathable). Course dust particles generally only reach as far as the inside of the nose, mouth and throat. Smaller or fine particles, however, can get much deeper into sensitive regions of the respiratory tract and lungs.

These smaller particles have a greater potential to cause serious harm to health. Commonly, particles in dust storms tend to be course or irrespirable and do not pose a serious health threat.

However, people with pre-existing problems (i.e. asthma and emphysema), may experience difficulties.

The following precautions can help minimize the adverse effect of a dust storm:

- Wear close fitting;
- Wear goggles to protect eyes from winds and sand;
- Remain indoors, keep windows closed properly and turn on the air conditioner.
- Driving during a dust storm are often hazardous, so its recommended to stay off the roads as much as possible, If one cannot stay of the roads, it is recommended to:
  - Close the windows;
  - Proceed at a speed suitable for the visibility;
  - Keep the lights on;
  - Sound the horn if necessary;
  - If visibility is too low, try to park in a safe place to avoid collisions, keep lights on.

The Weather forecasts are required to be monitored for the likelihood of sandstorms. OSH Department will notify the Project Team in the case of any possibilities of sandstorm.

The Construction Director must initiate to suspend all the external works and to remove persons to safe areas as the dust levels could put health and safety at risk.

In case of minor dust all operatives working external works will be provided suitable kind of face mask to avoid dust inhalation, preferred Mask is N95.

In event of severe sandstorm where visibility fall below 10m, external works will be called off until storm subside. Work will resume after weather conditions is back to normal and no danger to any employees on project site.

Rest areas and eating areas to be suitably protected from sand ingress by closing any openings and sealing the all joints and holes.

9 HEAVY RAINS AND FLASHFLOODS

In correspondence of heavy rains season where flash floods are more likely, the Management shall ensure the preparation of dedicated Flood Management Plans identifying:

- Areas with higher likelihood for floods;
- Arrangements for preventing flash floods, based on risk level;
- Prioritization of intervention;
- Emergency equipment to be available.

When sudden heavy rains occur, the following actions must be taken:

- Appropriate materials and equipment (i.e. plywood boards, drainage pumps, etc.) must be readily available to facilitate securing project assets;
- In all excavations and along site roads drainage provisions shall be present to ensure stability and prevent water ingress which may affect them;
- Drainage pumps shall be monitored for proper operations during and after heavy rains;
- Electrical generator must be secured;
- Workers shall be provided with appropriate PPE (waterproof boots and raincoats);
- After the rain has stopped, supervisors shall inspect their areas to assure safe conditions before allowing the workers to resume their activities;
- All external industrial electrical plugs & sockets used will be weatherproof;
- Excavations must be inspected following periods of rain (additional inspection regime over and above the start of shift inspection must be done as and when required); Worker welfare/rest facilities must be adequately protected from water ingress;
- DB panels must be:
  - IP-rated and fitted with IP-rated glands to prevent water ingress;
  - Covered with plywood overhead protection;
  - Placed on stands to keep them 1m from ground;
  - Having emergency contact number of the concerned electricians labelled with their photographs (including Night Shift if applicable).
- Step down Transformers (SDT) will be placed on stands with overhead protection. As for DBs, emergency contact number of the concerned electricians labelled with their photographs will be posted;
- ELCB must be checked monthly and electrical cables routed off ground where possible;
- Adequate provisions for dewatering of accumulated water will be considered;
- All drivers must be briefed on precautions to be taken while driving.

10 THUNDERSTORMS

Personnel shall cease all work if the time interval between a lightning flash and hearing thunder is less than 30 seconds (corresponding to a distance less than 10 km to the lightning)

If the time interval is less than 15 seconds (corresponding to a distance less than 5 km to the lightning), there is an immediate danger of lightning strikes nearby and personnel should quickly seek a less exposed position.

- Thunderstorm and lighting precautions include: Seek shelter in a substantial building with at least normal headroom or within totally enclosed, metal bodied vehicle;
- If on open ground, remote from shelter, crouch down, singly, with feet together.
- Footwear or a layer of any non-absorbing material, such as a plastic sheet, offer some protection against ground currents, should there be a nearby flash;
- Avoid high ground;
- Avoid touching or standing close to wire fences or tall metal structure;
- Avoid handling substantial metallic objects.

11 COLD WEATHER

Workers who work in cold environments may be at risk of cold stress. Cold weather is a dangerous situation that can lead to health emergencies in susceptible people. In regions unaccustomed to winter weather, near freezing temperatures are considered factors for cold stress.

Types of cold stress include trench foot, frostbite, hypothermia, and chilblains. Anyone working in a cold environment may be at risk of cold stress.

The following measures shall be implemented in case of cold weather, to protect employees:

- Workers shall be trained on how to prevent and recognize cold stress illnesses and injuries and how to apply first aid treatment, as well as appropriate engineering controls, personal protective equipment, and work practices to reduce the risk of cold stress;
- Radiant heaters shall be used to warm workers in outdoor stations;
- If possible, work areas shall be shielded from drafts or wind to reduce wind chill;
- Schedule heavy work during the warmer part of the day;
- Workers are encouraged to monitor co-workers for cold stress signs (“Buddy system”);
- Reduce the physical demands of workers (for example, use relief workers or rotate extra workers in and out of work for long, demanding jobs);
- Workers shall be allowed to interrupt their work if they are extremely uncomfortable;
- Workers shall be granted frequent breaks in warm areas;
- Provide workers with adequate, warm PPE;
- Workers shall consider the following tips when working in cold weather:
  - Monitor your physical condition and that of your coworkers;
  - Take regular breaks to warm up when needed;
  - Dress properly for the cold;
  - Stay dry in the cold because moisture or dampness, e.g. from sweating, can increase the rate of heat loss from the body;
  - Keep extra clothes handy in case you get wet and need change;
  - Drink warm sweetened fluids (no alcohol);
  - Avoid touching cold metal or wet surfaces with bare skin;
  - Use proper engineering controls, safe work practices, and personal protective equipment (PPE) provided by your employer.

12 FOG

Fog can create dangerous driving and working conditions. Fog is actually made up of tiny water droplets that are suspended in the air that reflect light, so it's important NOT to use high beams. The biggest risk associated with working in fog is decreased visibility.

The risk of fog on a worksite is most common on docks and near coastlines and valleys on large construction sites using heavy machinery to transport materials.

The following safety tips apply in particular to drivers and operators:

- Slow down and allow extra time to reach your destination;
- Make your vehicle visible to others both ahead of you and behind you by using your low-beam headlights since this means your taillights will also be on;
- Use fog lights if you have them;
- Never use your high-beam lights. Using high beam lights causes glare, making it more difficult for you to see what's ahead of you on the road;
- Leave plenty of distance between you and the vehicle in front of you to account for sudden stops or changes in the traffic pattern;
- Ensure you are staying in the proper lane, follow the lines on the road with your eyes;
- In extremely dense fog where visibility is near zero, the best course of action is to first turn on your hazard lights, then simply pull into a safe location such as a parking lot of a local business and stop;
- If there is no parking lot or driveway to pull into, pull your vehicle off to the side of the road as far as possible;
- Once you come to a stop, turn off all lights except your hazard flashing lights, set the emergency brake, and take your foot off of the brake pedal to be sure the tail lights are not illuminated so that other drivers don't mistakenly run into you.

13 APPENDICES

Appendix A. Heat Stress Index Chart

Appendix B. KSA Government Guidelines

Appendix C. Awareness Posters

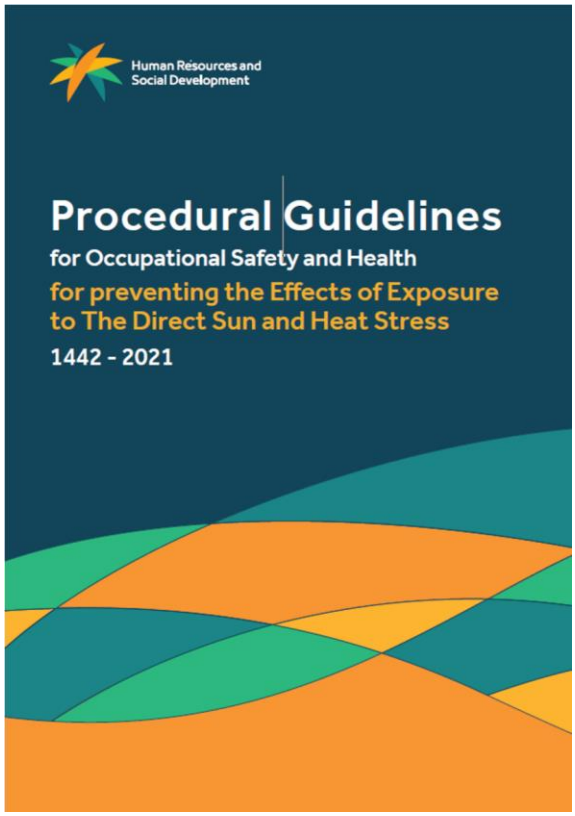
Appendix A. Heat Stress Index Chart

Heat Index Chart
Temperature (°C) vs Relative Humidity

	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%
48°	48	49	55	57											
47°	47	47	51	55	59										
46°	44	46	49	53	57	62	59								
43°	40	42	44	47	50	54	58	62	66						
40°	38	39	40	43	45	48	50	54	57	61	65				
38°	35	36	37	38	40	42	43	46	49	52	56	58	62	64	
35°	32	33	34	36	36	37	38	40	42	43	46	48	51	54	58
32°	29	30	31	32	32	33	34	35	36	37	38	39	41	43	45
29°	27	27	28	29	29	29	30	30	31	32	32	33	34	35	36
27°	24	24	25	25	26	26	26	27	27	27	28	28	29	30	30

Humidex Value	Heat Syndrome	Rest Period (Every Hour)
54 or higher	Heat stroke / sun stroke highly likely with continued exposure.	Stop all work
41- 53	Sun stroke, heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/ or physical activity	15min / Hour
33- 40	Sun stroke, heat cramps and heat exhaustion possible with prolonged exposure and/ or physical activity.	10min / Hour
24- 32	Fatigue possible with prolonged exposure and/ or physical activity.	If Required

Appendix B. KSA Government Guidelines



1- Introduction

The Ministry of Human Resources and Social Development has prepared the Manual for the prevention of the effects of exposure to working in hot places, which has relied on a number of relevant international technical and standard references and specifications as inputs and sources of information.

Since the negative effects and special occupational diseases resulting from the direct exposure to sunlight and heat stress in the workplace with long and frequent exposure, work was carried out on developing controls and instructions for preserving the safety and health of workers in the workplace.

2- Scope

This Manual is about the occupational safety and health requirements related to work in the hot environments by clarifying roles, responsibilities and preventive procedures from risks and impacts, through providing the mentoring and education programs, as well as the need to provide preventive occupational safety and health requirements in all workplaces, and responding to emergencies from exposure to work risks in hot places.

3- Terms and Definitions

3.1- Sunstroke (Heat stroke):

A person is exposed to sunstrokes, as a result of prolonged exposure to hot and humid weather, with the body's inability to dispose of liquids by sweat.

3.2- Heat Stress:

A person develops a heat stress as a result of exposure to hot and humid weather, leading to the loss of many fluids from the body through profuse sweats such as occurs with Hajj and Umrah performers, as well as during running in very hot weather.

3.3- Heat Rash:

Skin irritation resulting from the extreme sweating during summer and heat, and the heat rash occurs when skin glands are blocked and sweat is retained under the skin.

3.4- Heat Cramps:

Involuntary muscle cramps that affect the human body and is very painful, usually occur when a person is sweating and doing hard work, such as long work, excess movement, physical exercise, and brisk walking.

3.5- Heat Syncope:

A case of sudden syncope that affects a person when standing for long hours and sitting suddenly, as a result of an aneurysm in the body.

4- Roles and Responsibilities

4.1- Employer:

One of the most important responsibilities of the employer is to provide resources to ensure achieving the following:

4.1.1:

Providing training, counselling and education for all management levels, and workers exposed to working in hot places with symptoms related to the heat exposure such as: Heat stroke, dehydration and other, as well as prevention methods.

4.1.2:

Providing personal protective equipment for workers such as: Head protective cap.

4.1.3:

Providing a trained person to observe and respond to situations resulting from high temperatures during work.

4.1.4:

Providing a device for temperature and relative humidity to measure degrees at variable intervals during work (See appendix 5.1).

4.1.5:

Providing fluids to workers, the most important of which is cold potable water.

4.1.6:

Scheduling in the coldest times of the day.

4.1.7:
Taking all precautions, engineering designs, control and engineering implementation that allow heat reduction.

4.1.8:
Conducting an evaluation of work risk in hot work places to identify persons with possible exposure to it and identify preventive measures.

4.1.9:
Ensuring the application of the Ministry of Human Resources and Social Development's Regulations on suspending work in the afternoon of the summer months mentioned in the Regulations.

4.1.10:
Ensuring that workers exposed to the risks of working in hot places are given adequate breaks.

4.1.11:
Ensuring the adaptation process for experienced or new workers to work in hot weather (See appendix 5.2).

4.1.12:
Ensuring that all workers exposed to the risks of working in hot places are examined and medically fit.

4.1.13:
Providing a dedicated, suitable and prepared place to spend breaks for workers.

4.1.14:
Providing a bright colors uniform for workers, preferably of light, loose cotton.

4.2- Safety Officer/Worker Supervisor:
One of the most important responsibilities of the employer is to provide resources to ensure achieving the following:

4.2.1:
Providing a brief explanation of the work and the resulting risks to workers prior to commencing the work.

4.2.2:
Following-up on workers and ensuring that they wear the appropriate personal protective equipment during work.

4.2.3:
Filling in the worksite check form before commencing the work (See appendix 5.3).

4.2.4:
Ensuring that atmospheric temperature and relative humidity are appropriate as per the heat index before doing work (See appendix 5.1).

4.2.5:
Ensuring that fluids, especially water, are available in the workplace.

4.2.6:
Observing the physical condition of workers.

4.3- Workers:
One of the most important responsibilities of the workers is to ensure achieving the following:

4.3.1:
Ensuring that they wear light-colored, loose clothes, like cotton clothes.

4.3.2:
Drinking cold water and liquids continuously.

4.3.3:
Reducing the drinking of fluids containing caffeine or excessive amounts of sugar.

4.3.4:
Taking breaks at designated places of breaks.

4.3.5:
4.3.5 Ensuring to obtain enough sleep at night.

4.3.6:
Informing the supervisor or safety officer in case of stress or fatigue symptoms.

4.4- Most prominent factors controlling the risk of working under sunshine or hot places:

4.4.1:
Temperature and humidity.

4.4.2:
Time period of exposure.

4.4.3:
Activity nature (Exerted effort in work).

4.4.4:
Workplace (Open, closed, ventilated or blocked place).

4.4.5:
Worker sex and age.

4.4.6:
Worker health condition.

4.5- Sunstroke symptoms:

4.5.1:
Headache, dizziness and fatigue.

4.5.2:
Different levels of consciousness.

4.5.3:
Skin: Dry and hot (may be wet in some conditions)

4.5.4:
Pulse: Quick and weak.

4.5.5:
Muscle cramps.

4.5.6:
Dilated pupils.

4.6- First aid procedures in case of exposure to the sunstroke:

4.6.1:
Transferring the infected person to a cold place and removal their external clothes.

4.6.2:
Wrapping the infected person in wet coverlet every 10 minutes until their temperature decreased.

4.6.3:
Placing the infected person in an air current (Fan or air conditioner).

4.6.4:
Spraying the infected person body with the cold water if the coverlet is not available.

4.6.5:
Contacting the emergency number in the workplace or contacting 997 (Red Crescent Operations)

4.7- Heat stroke symptoms:

4.7.1:
Headache, dizziness and fatigue.

4.7.2:
Nausea and vomiting.

4.7.3:
Skin: Wet, sweaty, and pale-colored.

4.7.4:
Cramping and pain in muscles.

4.7.5:
Breathing: Quick and shallow.

4.7.6:
Pulse: Quick and weak.

4.8- First aid procedures in case of exposure to the heat stroke:

4.8.1:
Transferring the infected person to a cold place and removal their external clothes.

4.8.2:
Drinking excessive amounts of fluids, dehydration treatment solution or saline solution (Half a teaspoon of salt per half a liter of water).

4.8.3:
Laying the infected person down on their back, with raising their feet at a higher level than their body.

4.9- Sunstroke symptoms:

4.9.1:
Adding heat insulation materials in building roofs at work sites.

4.9.2:
Providing shaded work places.

4.9.3:
Providing air-conditioned work places.

4.9.4:
Using an exhaust ventilation system over the heat generating operations area.

4.9.5:
Using ventilation cooling system with air blasting fans to increase the air flow.

5- Appendixes

5.1- Heat Index

We recommend using the heat index to classify the work scopes as per the temperature and humidity of the workplace, and from these scopes we can determine the preventive measures to reduce the exposure to heat risks by applying a observing system for rising atmospheric temperatures conditions, controlling breaks, and choosing the coldest times of the day to conduct works.

The heat index consists of two parts: Atmospheric temperature and relative humidity.

The index indicates the actual temperature that the human body feels. When the index gives a high temperature, the risk of occupational injury and illness related to working in hot places increases.

Heat Index

Risk degree	Heat Index °C	Symptoms/illnesses of exposure to high temperature	Breaks	Need to water per hour
CAUTION	29-25	Possibility of developing fatigue upon the prolonged exposure or hard physical effort	Scheduled usual position	4-6 cups*
EXTREME CAUTION	39-30	Possibility of muscle cramps, heat stroke, sunstroke upon the prolonged exposure or hard physical effort	25% of working hours divided in equal breaks	4-6 cups*
DANGER	51-39	Most probably of exposure to muscle cramps, heat stress, sunstroke upon the prolonged exposure or hard physical effort	50% of working hours divided in equal breaks	4-6 cups*
EXTREME DANGER	52+	Is about to being exposure to a sunstroke	75% of working hours divided in equal breaks, and it is recommended that the work is suspended when the heat index reaches 56 and more.	4-6 cups*

*One cup = 250 ml

5.2 Steps of adaption of workers exposed to working in hot places:

The adaption of workers to work in hot places is according to the percentages shown in the table below:

Workers adaption steps		
Day	Experiences workers	New workers
1	50%	20%
2	60%	40%
3	80%	60%
4	100%	80%
5	100%	100%

Heat Index المؤشر الحراري	Relative Humidity الرطوبة المرتبطة								
Air Temp °C درجة الحرارة	10%	20%	30%	40%	50%	60%	70%	80%	90%
>50	49	**	**	**	**	**	**	**	**
50	48	**	**	**	**	**	**	**	**
49	47	**	**	**	**	**	**	**	**
48	45	53**	**	**	**	**	**	**	**
47	44	51	**	**	**	**	**	**	**
46	43	49	**	**	**	**	**	**	**
45	42	47	**	**	**	**	**	**	**
44	41	46	52**	**	**	**	**	**	**
43	40	44	49	**	**	**	**	**	**
42	39	42	47	54**	**	**	**	**	**
41	38	41	45	51	**	**	**	**	**
40	37	39	43	48	**	**	**	**	**
39	36	38	41	46	52**	**	**	**	**
38	35	37	39	43	49	55**	**	**	**
37	34	35	38	41	46	51	**	**	**
36	33	34	36	39	43	48	54**	**	**
35	32	33	35	37	41	45	50	**	**
34	31	32	33	35	38	42	47	53**	**
33	31	31	32	34	36	40	44	48	54**
32	30	30	31	32	34	37	40	44	49
31	29	29	30	31	33	35	38	41	45
30	28	28	29	30	31	33	35	38	41
29	27	27	28	29	30	31	33	35	37
28	27	27	27	28	28	29	31	32	34
27	26	26	26	27	27	28	29	30	31
26	25	25	26	26	27	27	27	28	28

5.3 Applying the worksite examination models:

Worksite Examination	Yes	No
Are rest seats available, and shaded in workplace?		
Are there posters reminding workers of the importance of drinking water?		
Is there communication means to inform workers of environmental conditions, such as flags?		
Is cold and potable water or other liquids available?		
In the event of availability of drinking water supply, are water containers tightly covered from the top, and is filling date stated on container?		
Are fruits and snacks available for workers during work performance for preservation of nutrients and calories?		
Are there posters reminding workers of injury or disease's symptoms and signs upon exposure to high temperature?		
Are there paramedics at worksite?		
Are emergency medical numbers available?		
Knowledge & Training	**Yes**	**No**
Do workers know injury or disease's symptoms and signs upon exposure to high temperature?		
Is there a trained first aid provider at worksite?		
Does the first aid provider have valid training certificates issued by approved centers?		
Does the first aid provider have a complete first aid kit including tools suitable for worksite hazards?		
Is the first aid provider trained on treatment of cases of injury or disease's symptoms and signs upon exposure to high temperature?		
Does the first aid provider and work supervisor know the method to communicate with and direct medical emergency to worksite?		
Has a virtual scenario been performed in worksite for the process of treatment of cases of exposure to high temperature?		
Is there a mean to contact medical emergency at worksite?		
Worksite Procedures	**Yes**	**No**
Does worksite have environmental conditions and heat stress assessment processes?		
Are meals provided by employer? If yes, Are meals provided to workers appropriate and compatible with worksites of high temperatures?		
Is TBT: toolbox talk applied prior to work commencement?		
Is noon work ban law issued by Ministry of Human Resources and Social Development applied at worksite?		

5.4 Golden rules for preventing from the effects of exposure to sunlight and work in the hot place:

Drinking excessive amounts of fluids, especially water even if you are not thirsty every 15 to 20 minutes.

If you felt fatigue or dizziness, stop working immediately and inform other workers around you

Ask for help and do not carry out the work a lone

Wear light and bright-colored clothes

Try to work in shaded places

Make sure to take breaks in shaded places

6- References

Freedland, L., 1987. Safety-health and working conditions. Stockholm: Joint Industrial Safety Council.

HSE, 2013. Workplace health, safety and welfare. Sudbury, Suffolk: Health and Safety Executive.

HSE, 2021. HSE - Temperature: Outdoor working. [online] Hse.gov.uk. Available at: <https://www.hse.gov.uk/temperature/outdoor.htm> [Accessed 1 June 2021].

ILO, 2014. Physical Hazards - Heat in the Workplace. [ebook] ILO. Available at: <https://www.ilo.org/caribbean/projects/WCMS_250199/lang--en/index.htm> [Accessed 28 May 2021].

Kjellstrom, T., Maître, N., Saget, C., Otto, M. and Karimova, T., 2019. Working on a warmer planet: The effect of heat stress on productivity and decent work. [ebook] ILO. Available at: <https://www.ilo.org/global/publications/books/WCMS_711919/lang--en/index.htm> [Accessed 29 May 2021].

Kjellstrom, T., Otto, M., Lemke, B., Hyatt, O., Briggs, D., Freyberg, C. and Lines, L., 2021. Climate Change and Labour: Impacts of Heat in the Workplace. [ebook] UNDP. Available at: <https://www.ilo.org/global/topics/green-jobs/publications/WCMS_476194/lang--en/index.htm> [Accessed 29 May 2021].

McDonald, O.F., Shanks, N.J. and Fragu, L., 2008. Heat stress improving safety in the Arabian Gulf oil and gas industry. Professional Safety, 53(08).

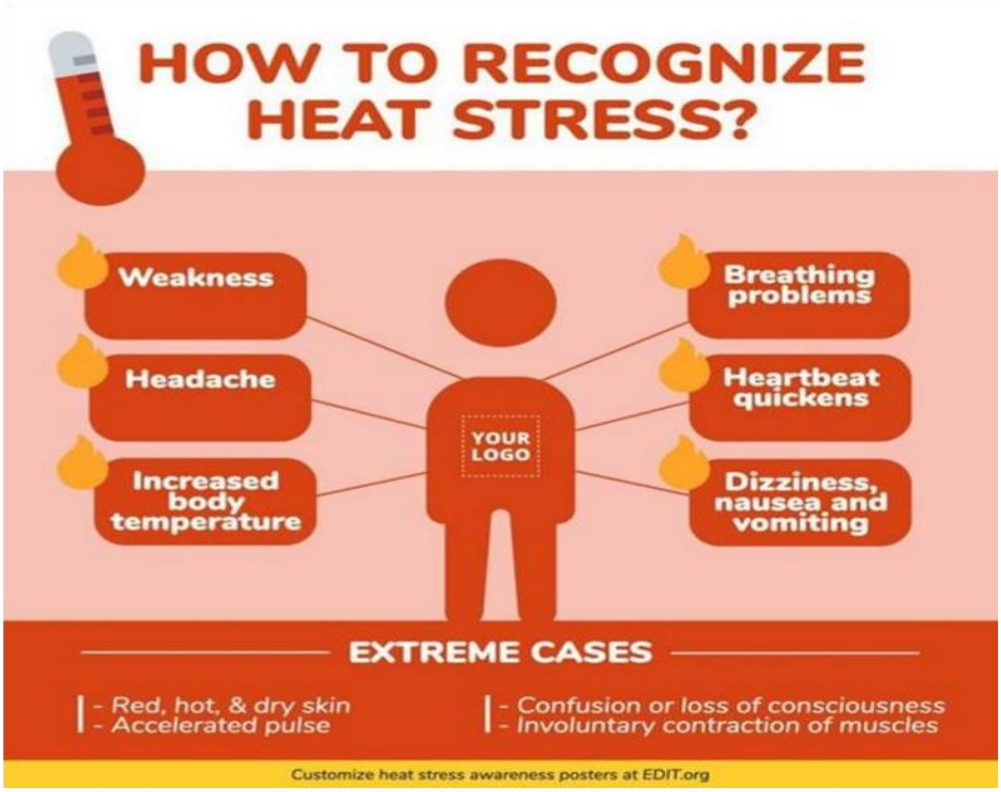
OSHA, 2021. Heat. [online] Occupational Safety and Health Administration. Available at: <https://www.osha.gov/heat-exposure> [Accessed 28 May 2021].

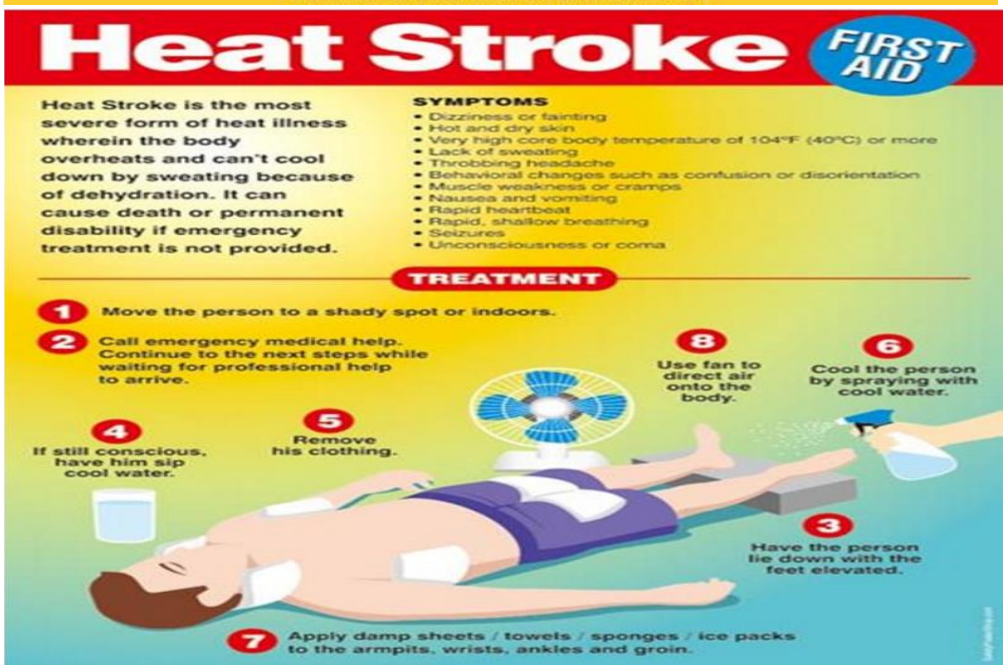
OSHA, 2021. Heat Illness Prevention. [online] Occupational Safety and Health Administration. Available at: <https://www.osha.gov/heat/> [Accessed 28 May 2021].

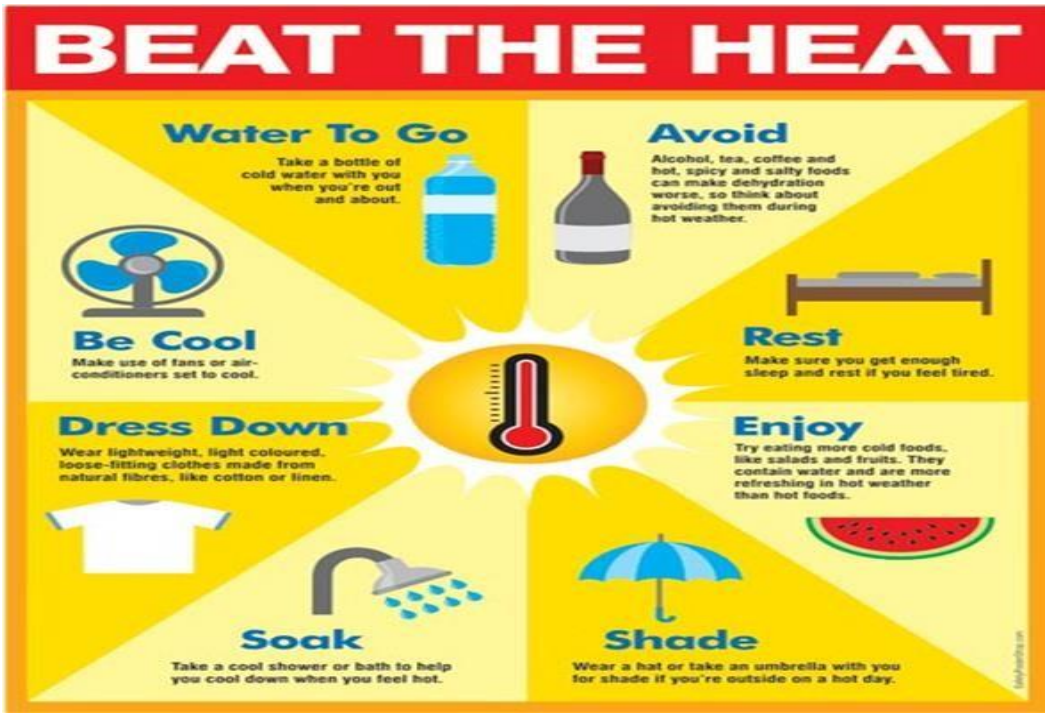
OSHAD, 2016. Safety in the Heat. [online] Oshad.ae. Available at: <https://www.oshad.ae/Lists/OshadSystemDocument/Attachments/123/OSHAD-SF%20-%20TG%20-%20Safety%20in%20the%20Heat%20v3.0%20English.pdf> [Accessed 30 May 2021].

Safe Work Australia, 2021. Managing the risks of working in heat. [ebook] Safe Work Australia. Available at: <https://www.safeworkaustralia.gov.au/doc/guide-managing-risks-working-heat> [Accessed 28 May 2021].

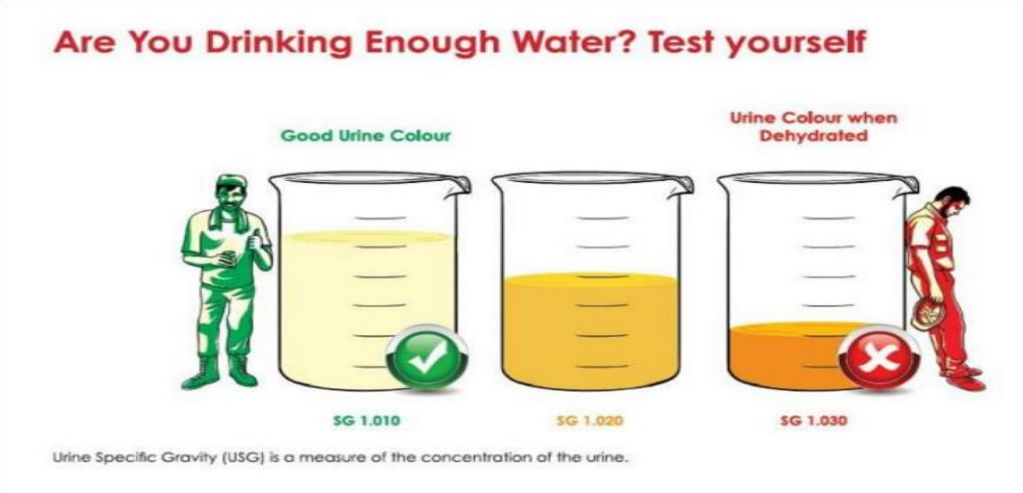
Saudi Red Crescent Authority, 2014, The Guidance in First Aid, Prince Naif for First Aid Principles

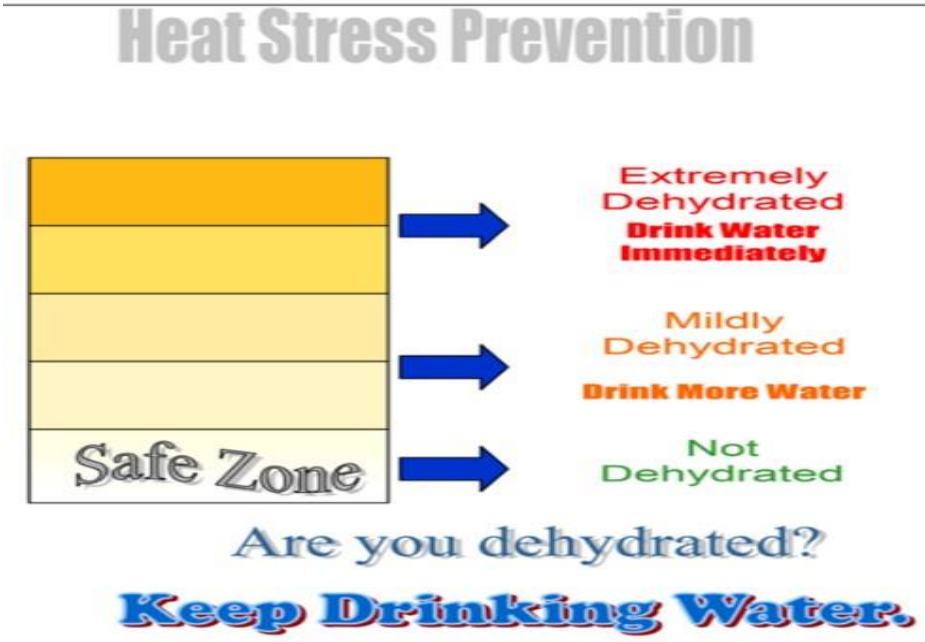

HOW TO RECOGNIZE HEAT STRESS?
Weakness
Headache
Increased body temperature
YOUR LOGO
Breathing problems
Heartbeat quickens
Dizziness, nausea and vomiting
EXTREME CASES
- Red, hot, & dry skin
- Accelerated pulse
- Confusion or loss of consciousness
- Involuntary contraction of muscles
Customize heat stress awareness posters at EDIT.org


Heat Stroke
FIRST AID
Heat Stroke is the most severe form of heat illness wherein the body overheats and can't cool down by sweating because of dehydration. It can cause death or permanent disability if emergency treatment is not provided.
SYMPTOMS
• Dizziness or fainting
• Hot and dry skin
• Very high core body temperature of 104°F (40°C) or more
• Lack of sweating
• Throbbing headache
• Behavioral changes such as confusion or disorientation
• Muscle weakness or cramps
• Nausea and vomiting
• Rapid heartbeat
• Rapid, shallow breathing
• Seizures
• Unconsciousness or coma
TREATMENT
1 Move the person to a shady spot or indoors.
2 Call emergency medical help. Continue to the next steps while waiting for professional help to arrive.
3 Have the person lie down with the feet elevated.
4 If still conscious, have him sip cool water.
5 Remove his clothing.
6 Cool the person by spraying with cool water.
7 Apply damp sheets / towels / sponges / ice packs to the armpits, wrists, ankles and groin.
8 Use fan to direct air onto the body.


BEAT THE HEAT
Water To Go
Take a bottle of cold water with you when you're out and about.
Avoid
Alcohol, tea, coffee and hot, spicy and salty foods can make dehydration worse, so think about avoiding them during hot weather.
Be Cool
Make use of fans or air-conditioners set to cool.
Rest
Make sure you get enough sleep and rest if you feel tired.
Dress Down
Wear lightweight, light coloured, loose-fitting clothes made from natural fibres, like cotton or linen.
Enjoy
Try eating more cold foods, like salads and fruits. They contain water and are more refreshing in hot weather than hot foods.
Soak
Take a cool shower or bath to help you cool down when you feel hot.
Shade
Wear a hat or take an umbrella with you for shade if you're outside on a hot day.


HEAT STRESS/STROKE FIRST AID
Move to a cool, shady area
HEAT STROKE CALL
SITE EMERGENCY CONTACT
Cool down entire body
Spray or shower with cold water
Use a fan or move to a room with air conditioning
Place cool wet towels or ice packs on neck, armpits and groin
Remove excess clothing
If conscious, give fluids (no caffeine or alcohol)
DO NOT GIVE FLUIDS IF HEAT STROKE SUSPECTED
Lie down with feet elevated


Are You Drinking Enough Water? Test yourself
Good Urine Colour
Urine Colour when Dehydrated
SG 1.010
SG 1.020
SG 1.030
Urine Specific Gravity (USG) is a measure of the concentration of the urine.


Heat Stress Prevention
Extremely Dehydrated
Drink Water Immediately
Mildly Dehydrated
Drink More Water
Safe Zone
Not Dehydrated
Are you dehydrated?
Keep Drinking Water.