



Lusail Real Estate Development Company

Health, Safety, Security, Environment, Logistics & Quality Department

Lusail Construction Safety Management Procedure – Heat Stress Management

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CONTENTS

- 1.0 INTRODUCTION**
- 2.0 PURPOSE & SCOPE**
- 3.0 OBJECTIVES**
- 4.0 ROLES AND RESPONSIBILITIES**
- 5.0 IMPLEMENTATION AND GUIDELINES**
- 6.0 ADDITIONAL PRECAUTIONARY MEASURES**
- 7.0 TRAINING AND EDUCATION**
- 8.0 REFERENCES**
- 9.0 ATTACHMENTS**

Abbreviations

EHS – Environmental, Health and Safety

EMS – Emergency medical services

ERP – Emergency response plan

PPE - Personal Protective Equipment

U/V - Ultra-violet

C° - Degrees Celsius (or Centigrade)

F° - Degrees Fahrenheit

Definitions

Basic medical health assessment: Employees shall complete a health questionnaire BEFORE the *basic health assessment* is performed. This *assessment will be completed* by a designated nurse or physician licence to practice. The assessment shall be done, prior to deployment or prior to exposure.

Project senior management: Refer to any, LUSAIL Project development - Contractor, Sub contractor, Vendor, Consultant, and Developer who engage in activity on Lusail Project Development site.

Sub-contractor: Any person, vendor or other contractor working on main contractor or developer site.

Safe drinking water: Water which has been tested and found fit for human consumption.

1. Introduction

Outdoor activities and tunnelling operations conducted in hot, humid weather especially those that require workers to wear semi-permeable or impermeable protective clothing, are likely to cause heat stress among exposed workers. Consequently, prevention of heat stress is an important consideration for Lusail and its Contractors/Consultants/Developers working in Qatar, particularly during the summer months when temperatures are commonly above 40°C.

Age, weight, degree of physical fitness, degree of acclimatization, metabolism, use of alcohol or drugs, and a variety of medical conditions, such as hypertension, all affect a person's sensitivity to heat stress.

It is difficult to predict just who will be affected, and when, because individual susceptibility varies. In addition, environmental and operational factors causing heat stress are not restricted to ambient air temperature, as radiant heat, air movement, conduction and relative humidity all affect an individual's response to heat.

2. Purpose & Scope

The purpose of the heat stress management plan is to provide to all employees, contractors, consultants and developers guidelines for the identification and controls to be implemented to reduce the effect of exposure to extreme temperatures while doing outdoor activities and/or tunnelling operations.

3. Objectives

Lusail is committed to protect the health and safety of all involved while accomplishing its mission in achieving zero incident targets. The main objectives of the plan are:

- Basic medical health assessment for all employees prior to working where exposure to extreme temperatures outside or in tunnels, has been identified as a health hazard.
- Provision of temporary shaded and sheltered rest facilities and adequate supplies of drinking water in the work areas.
- Allocation of a rest regime to reduce heat exposure.

4. Roles and Responsibilities

The Contractor is fully responsible for the pre-planning, development of Method Statements, Job Hazard Analysis, and overall safe work planning and implementation. Project Management is responsible for the assurance that all work is planned and conducted according to the pre-planning documents; Contractor and Lusail Health Safety & Environment (HSE) procedures and the Qatar Construction Specifications 2010. Should a conflict occur between procedures/standards or requirements the more stringent shall apply.

4.1 Project Senior Management

Project senior management holds the ultimate responsibility for ensuring that this procedure is effectively communicated and implemented.

Responsible for ensuring that:

- This procedure is effectively implemented to prevent the workforce from unwanted exposure to extreme temperature conditions and resulting heat stress related illnesses or injuries.
- Adequate resources are provided to monitor the effectiveness of the control measures as mentioned in the procedure.
- Suitable and adequate welfare (including drinking water) and rest facilities are provided in work areas.
- All construction activities requiring a person to be exposed to extreme temperatures while working outside or in tunnels are properly planned, coordinated and executed.
- Arrangements are in place with Site EMS, site clinic or local hospitals for the immediate treatment of potential heat stress cases.
- Reporting of all heat stress cases which needed further medical intervention shall be reported and recorded as occupational illness case.

4.2 Project EHS Manager

The responsibilities of the HSE Manager will include, but not be limited to the following:

- Implementing and maintaining the procedure throughout the duration of the Construction Phase.
- Ensuring that this procedure is effectively implemented and diligently observed by all employees and subcontractors.
- Facilitate implementation of awareness on heat stress related illnesses and injuries through training, notice boards and distribution of information leaflets.
- Nominate a responsible person who shall perform inspections
- Report all heat stress cases to Lusail HSE.
- STOP work for non compliance.
- Make arrangements for the measurement and recording of humidex every working day and at a minimum every two (2) hours during summer months.

4.3 Subcontractor

Subcontractors are responsible for ensuring that:

- This procedure is effectively implemented, observed by and communicated to their work force throughout the duration of their employment.
- All activities requiring the workforce to be exposed to extreme temperatures outdoors and tunnelling operations are properly planned, coordinated and executed.
- A proper rest regime is planned and executed.
- Suitable personal protective equipment (PPE) is provided.
- Suitable and adequate temporary shade/shield rest facilities and drinking water supplies are provided in work areas. (SIG for specifications)
- Notify contractor HSE management about heat stress cases.
- Follow Site/contractor Emergency Response Plan for arrangements to dispatch medical assistance.

4.4 Lusail HSE Management

- STOP work authority for non-compliance
- Inspect and report to LUSAIL Project Management on compliance or deficit on site.

5. Implementation and Guidelines

5.1 Risk Control Guidelines

First and foremost, implement the Ministry of Labour's directives on summer timings.

*Any variance request from this directive shall be submitted in writing to Lusail HSE for approval.

Following approval evidence shall be provided to guarantee all proposed control measures are implemented and risk controlled.

5.1.1 Engineering Controls

Project senior management shall consider the implementation of either or all of the following engineering control measures during the Construction Phase to minimize the potential to expose workers to conditions which may cause heat stress.

5.1.2 Convection Methods

General Ventilation: General ventilation can be used to dilute hot air with cooler air (generally cooler air that is brought in from the outside). Such control measures will be considered for the workshops, tunnels and confined spaces.

5.1.3 Conduction & Radiation Methods

Insulation: Insulating hot surfaces that generate heat, and changing the surface itself, will reduce the amount of heat to which a worker may be exposed.

Shield: Shields can be used to reduce radiant heat, i.e. heat coming from hot surfaces within the worker's line of sight. Surfaces that exceed 35°C (95°F) are sources of infrared radiation that can add to the worker's heat load. Shields should be located so that they do not interfere with airflow, unless they are also being used to reduce convective heating. The reflective surface of the shield should be kept clean to maintain its effectiveness.

5.1.4 Evaporative / Refrigerative Methods

All buildings at site, particularly offices and accommodation / labor camps, shall be cooled using air-conditioning units. Two main types of air-conditioning units exist, i.e. evaporative and refrigerative.

Evaporative air conditioners cool and humidify the air, and operate by cooling the air as it is forced by a fan through water soaked material. The water evaporates, cooling the air that passes through it. During periods of high humidity, the water can be turned off and the unit used as a large fan circulating air throughout the building.

Refrigerative air conditioners remove heat from the building, and cool the air to achieve a set temperature. Refrigerative air conditioners use the same operating principle as refrigerators, i.e. they "pump" heat from one place to another. Like refrigerators, they have two connected coils - an inside coil and outside coil, and these coils are connected by pipes filled with refrigerant which is pumped around the circuit by a compressor. As warm air passes over the indoor coil, heat is transferred to the refrigerant passing through the coil and pumped to the outdoor coil where it is dissipated into the atmosphere.

5.1.5 Shade

Subcontractors will provide canopies or awnings over sections of the site where work is being carried out, to shield workers from the U/V rays of the sun, as well as from the direct heat of the sun. Radiant heat load should be reduced by 10 -15 degrees.

5.1.6 Suitable and Adequate Rest Facility

Canopies, awnings or tents will also be erected to provide shade, shelter and adequate airflow, for workers taking their predetermined rest breaks, to minimize their exposure to the direct sun. This facility must provide protection from other environmental exposure hazards, which include dust, biological, excessive wind est. Provide air-conditioned sheds/buildings or vehicles for workers to take rest breaks in, and locate these rest areas within close proximity to the work area (preferably within 25 meters) to minimize the distance required to walk. Ablutions shall be provided in close proximity to the resting facility. (Hand washing and toilets) Additional safe drinking water shall be available.

The rest facility temperature shall be 10 -15 degrees Celsius less than the outside environmental temperature.

5.1.7 Limiting Exposure Time and/or Temperature (Rest Regimen)

A schedule shall be implemented to minimize the exposure of workers to conditions that may cause heat stress.

5.2 Rest Regimen

Provide regular rest breaks during hot weather to allow the body to cool down, especially where the work is hard and physical. The following points provide guidance as to the minimum rest breaks to be provided every hour for outdoors and tunnelling operations during high temperatures and humidity. To ensure that these rest breaks are taken, the Subcontractor shall provide an effective method (e.g. audible alarm) to inform or remind their workers that it is time to take a break.

When possible during the hot summer season, schedule strenuous or hot jobs for the cooler part of the day (early morning, late afternoon, or night shift).

Add extra personnel to reduce exposure time for each member of the crew.

Permit freedom to interrupt work when a worker feels extreme heat discomfort.

Adjust schedule when possible so that "hot work" are not performed at the same time and place as other operations that require the presence of workers.

Provide air-conditioned sheds / buildings, busses or vehicles for workers to take rest breaks in, and locate these rest areas within close proximity to the work area (preferably within 25 meters) to minimize the distance required to walk.

5.3 Fluid Replacement

- Cool water shall be made readily available to all workers, and workers should be encouraged to drink adequate amounts of water frequently (preferably every 20-30 minutes) to replace the water lost through sweating. Cold water supplies should be located in close proximity to all working areas, to encourage frequent drinks.
- Adequate amounts of clean water shall be available for drinking and cold compress of heat stress cases, in shelter areas
- Process in place at work site to request delivery of extra water
- It should be noted that, in hot climates, each worker should drink at least four (4) litres of water during an 8-hour shift and six (6) litres during a 10-hour shift.
- Workers can be provided with, and encouraged to drink, electrolyte solutions (e.g. Gatorade, Powerade and Pocari Sweat) containing essential minerals, such as sodium, potassium, calcium and magnesium. No caffeine. These drinks aid to replace essential salts lost during sweating and, thus, reduce the potential for dehydration; heat cramps and heat exhaustion
- If workers are provided with an electrolyte supplement, management will demonstrate controls in place to prevent harm and adverse effect, when using electrolyte replacement in excess.
- Electrolyte replacement is adequate in a balanced nutritional meal plan.
- Water should be from a safe “drinking water” source.
- Igloos and water dispensers shall have a cleaning and disinfectant schedule once every shift.

It is recommended that workers do not take salt tablets (or large amounts of salt on their food), as more water will be required by the body to remove excess salt, which increases the amount of work for the kidneys and further increases the risk of dehydration. Salts tablets (or excess salt) also increase the risk of high blood pressure.

5.4 Basic Medical Assessment

Only workers, who had a health assessment and signed off by a nurse/doctor, will be allowed to work in conditions where heat stress is a possibility.

All employees are required to undergo a Based medical assessment prior to their working on site in extreme temperatures.

5.5 Protective Clothing / PPE

Workers on site are required to wear appropriate Personal Protective Equipment (PPE), such as safety helmets, safety shoes / boots, coveralls (or at least long trousers and long-sleeved shirts) and safety glasses (tinted for use in the sun or bright conditions). This PPE provides some protection from the sun’s harmful U/V rays, but does not prevent heat stress. [LUS-HSE-WG3-446-006](#), Personal Protective Equipment)

- Mandatory use of Cooling Bandanna Head band
- Coverall used by all work men

5.6 Inspections

Responsible personnel will perform routine informal and formal inspections on site to check that the requirements of this Heat Stress Prevention Procedure are being implemented and in compliance with Lusail Project criteria. *Sample checklist in SIG.

The findings of these inspections will be reported to Contractor Management and the Supervising Consultant for intervention and close out.

5.7 Acclimatization

Progressive exposure to hot environment of individuals, who is new to the project or from vacation, should be facilitated. Deployment should initially be in shaded area.

Prolonged exposure to direct sunlight in the summer months should be reduced/ avoided (as per Qatar Labor Law) where possible. Long exposure to sunlight may result in skin cancer.

Those with fair skin are particularly prone to sunburns compare to those with darker skin. Appropriate precautions hence are needed to be identified based on risk assessment for individual as appropriate taking into account their health conditions.

5.8 Risk Assessment

Prior to any work being undertaken, a risk assessment must be prepared. During a job specific risk assessment, issues such as heat stress will be included and appropriate protection and mitigation measures developed and implemented, where required.

6. Additional Precautionary Measures

In addition to the Risk Control Measures provided in Section 5, the following precautionary measures should be observed by Project Management, to minimize the potential for heat stress related illnesses and injuries.

- Follow the summer work hours as instructed by Qatar Government
- Provide accurate verbal and written instructions, frequent training programs, and other information about heat stress related conditions, which is understood by the work force.
- Assure co-worker observation to detect signs and symptoms of heat stress.
- Pay extra attention to those who take medications that compromise normal cardiovascular, blood pressure, body temperature regulation, renal, or sweat gland functions.
- Ensure that first-aiders are properly trained and an available evidence of training record available, indicating training covered: recognition of heat stress symptoms and required treatment.
- Ensure that temperature and humidity are measured and recorded regularly, at all high risk locations incl. tunnels and confined spaces.
- Site ERP plan is implemented and up to date to ensure medical assistance is not delayed.
- Encourage buddy system when doing outdoor activities and tunnelling operations conducted in hot, humid weather
- Sunscreen for fair skinned employees to prevent sun burn and/or increased risk of skin cancer

7. Training and Education

Training is the key to good work practices. Unless all employees understand the reasons for using new, or changing old work practices, the chances of such a program succeeding are greatly reduced. In accordance with the HSE training program, appropriate training will be provided in the requirements of this Heat Stress Management Plan.

The general site HSE Induction provided to all employees will include but not limited to information on causes, signs and symptoms of heat stress related illnesses, minimum PPE requirements, the need to take regular rest breaks in the shade, and the need to drink plenty of water (to replace body fluids lost through sweating) when working in hot climates and the emergency response arrangements when heat stress is identified.

Specific heat stress training will be provided to all Managers, Supervisors, First aiders and HSE Representative(s).

Training will include, but not be limited to, the following components:

- Emergency response process to dispatch medical assistance
- Knowledge of the hazards of heat stress
- Recognition of predisposing factors, danger signs, symptoms and potential effects of heat stress related illnesses and injuries
- Awareness of first-aid procedures for treatment of heat stress related illnesses and injuries, including heat stroke, heat exhaustion and heat cramps
- Employee responsibilities in avoiding heat stress

- Dangers of using drugs, including therapeutic ones, and alcohol in hot work environments
- Use of protective clothing and equipment
- Planning of strenuous / physical activities and hot operations for cooler periods, wherever possible, e.g. early morning or evening / night
- Request for delivery of additional water supply during working hours
- Importance of regular (hourly) rest breaks, in the shade or air-conditioning, during hot periods
- Requirement to regularly drink water or electrolyte drinks to replace body fluids lost through sweating
- Personnel should be made aware of the requirement to drink at least four (4) litres of water during an 8-hour shift and six (6) litres during a 10-hour shift
- Use of relief workers, where possible

8. References

Qatar Construction Specifications 2010 Section 11 Part 1.2.1.8 "Radiation, Sunshine, and Heat Stress"

9. a

[LUS-HSE-FM4-446-076](#)

Work/Warm-up Schedule

FIRE EMERGENCY CHECKLIST

<u>Action</u>	<u>Description</u>	<u>Tick when done</u>
Action 1	Raise the alarm by shouting “Fire Fire Fire” and activate alarms	<input type="checkbox"/>
Action 2	Order evacuation of affected buildings and docks	<input type="checkbox"/>
Action 3	Telephone the Fire Service on 999 and tell them: <ul style="list-style-type: none"> • Location – Lusail Marina, Public Promenade, Lusail City • Type – boat, building, fuel etc 	<input type="checkbox"/>
Action 4	<ul style="list-style-type: none"> • If any people are at risk or are trapped Open all security gates and vehicle barriers	<input type="checkbox"/>
Action 5	Instruct a runner to meet and hand to the emergency services ERP plans for the marina	<input type="checkbox"/>
Action 6	Turn off all electrical power to the fire area	<input type="checkbox"/>
Action 7	Mobilise the fire systems and devices including the portable and workboat fire pumps	<input type="checkbox"/>
Action 8	Attempt to control the fire until the fire brigade arrive, evacuate if necessary	<input type="checkbox"/>
Action 9	Contact marina and company management	<input type="checkbox"/>
Action 10	Proceed to the follow-up action checklist (Form 6.15 ERP – Follow up Actions)	<input type="checkbox"/>
Manager:		Date:

REMEMBER

- *Never put yourself or others in danger, stay safe*
- *Do not fight the fire unless it is small and you can do so safely*
- *Do not turn on electricity or allow personnel to turn to the area, until advised by the Fire Service that it is safe to do so.*