Thermal Comfort Guidelines

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1  
Introduction

Working in hot or cold conditions without adequate control measures can create a number of adverse health effects ranging from discomfort to serious illness. Under the OH&S Act 2000 the University of Wollongong has a responsibility to provide a safe place to work and study for staff and students. These guidelines on working in hot or cold conditions are to provide a means of ensuring that supervisors and employees are aware of risks associated with working in these environments and associated strategies to put into place to minimise the risk of injury.

2  
Background

There are times when tasks or activities are required to be undertaken in hot or cold environments. These may not necessarily have been considered extreme temperatures, rather increasing the level of discomfort and possibly placing increased stressed and limitations on a person working in the area.

Environmental and personal factors lead to the discomfort of a work. These include:

- Air temperature
- Humidity
- Air movement
- Radiant heat
- Activity level
- Clothing

2.1  
Thermal discomfort

Thermal discomfort is not a medical condition. It is the discomfort experienced by most people when it is hot or cold. Most concerns that arise from working in heat are due to heat discomfort.

In many cases, although we feel considerable discomfort, the work conditions are such that we face no significant risk of succumbing to the serious health and safety problem of heat illness. However, working conditions that cause heat illness will also cause heat discomfort. People who work indoors completing sedentary tasks - for example, working in an office - are very unlikely to be at risk of suffering heat illness. Any heat problems they experience are far more likely to be due to heat discomfort.

3  
Scope

This document provides guidelines on the identification and control of risks in thermal work conditions (hot or cold environments). This document covers environments where staff, contractors or students may be required to conduct work tasks or activities.

4  
Responsibilities

4.1  
Managers

Managers are responsible for the overall implementation of this guideline in their respective work area. This includes:

- Establishment of a systematic process for regular review of hazards associated with hot and cold environments;
- Ensure employees are aware of their responsibilities, and are provided with adequate information, instruction and training;
4.2 Supervisors

Supervisors are to facilitate the risk management approach by ensuring that hazards are identified and they are communicated to employees, and that corrective actions/control measures are identified and implemented. Supervisors are the key people responsible for ensuring that the work environment and the work itself, is safe.

4.3 Employees

Employees have a responsibility to adopt the required controls, e.g. wearing of PPE, for working in hot or cold environments and to report conditions that may affect their work capability to the supervisor of the work area.

4.4 Occupational Health and Safety Unit

The OH&S Unit is responsible for providing advice and technical support regarding the hazards and controls associated with working in thermal environments. This includes administrative arrangements such as provision of training in hazard and risk management processes.

5 Risk management approach

Working in thermal conditions is a workplace hazard similar to others inherent to a University environment and is to be managed accordingly to prevent an injury. A risk management approach incorporating the process of identification, risk assessment and controls is required to be undertaken to ensure that hazards do not adversely affect the health and safety of University staff. As with any other workplace hazard, consultation with employees must occur to ensure that the process is as effective as possible. The following details a risk management approach to working in thermal conditions.

6 Identifying hazards

Identifying the sources of heat and cold is the first step in the process. Consideration should be made on the type of task and duration required in the work area.

The presence of the following factors may indicate a risk of heat illness occurring at a workplace or in a particular job or task:

- the work is physical;
- the employee has little or no control over their work flow;
- high temperatures;
- radiant heat: from the sun (e.g., in building and construction, horticulture, agriculture etc.), ovens, molten metal, as found in smelting, steel mills, furnaces, ovens, glassworks, ironing, plastics extrusions/moulding;
- high humidity, e.g., steam cleaning, laundries, mines;
- a lot of clothing is worn, e.g. overalls, boiler suit, safety boots or shoes, welding aprons, 'all over' clothing such as 'Tyvec' suits and suits worn during insecticide spraying, spray painting, etc.;
- employees who are overweight, physically unfit, feverish, have heart/circulatory/skin diseases, are dehydrated, use certain medicines;
- employees are unacclimatised to, and/or inexperienced in, working in heat;
- there is a heat wave in progress;
- employees have suffered from heat illness in the past or are suffering at present.
The presence of the following factors may indicate a risk of exposure to cold occurring at a workplace or in a particular job or task:

- the work is sedentary;
- the employee has little or no control over their work flow;
- low temperatures (such as artificially cold workplaces e.g. refrigerated areas);
- convection cold: air speed can increase the rate of heat loss from the body and decrease the air temperature;
- wet weather

6.1 Heat illness

Heat illness covers a range of medical conditions that can arise when the body is unable to properly cope with working in heat. These conditions include:

- heat stroke - a life threatening condition that requires immediate first-aid and medical attention;
- fainting in heat (heat syncope);
- heat exhaustion;
- heat cramps;
- skin rashes (Prickly Heat);
- heat fatigue; and
- worsening of pre-existing illnesses and conditions.

Signs and symptoms of heat illness include feelings of sickness, nausea, dizziness, weakness, clumsiness, collapse and convulsions. Employees with these signs or symptoms should seek immediate first-aid/medical attention.

Other health and safety problems caused by hot working conditions include:

- sweaty hands causing a loss of grip while handling objects, controls, etc.;
- falls and trips occurring due to fainting or fatigue;
- mental and/or physical fatigue leading to errors and mistakes;
- not using personal protection equipment (e.g., earmuffs, safety shoes, overalls, etc.) due to increased discomfort when it is hot;
- 'cutting corners' during work due to fatigue or discomfort;
- heat interacting with other hazards such as chemicals and manual handling;
- burns from contact with hot surfaces or substances.

6.2 Cold-related illness

Cold-related illness covers a range of medical conditions that can arise when the body is unable to properly cope with working in cold. These conditions include:

- Hypothermia - a life threatening condition that requires immediate first-aid and medical attention;
- Frostbite - Skin, muscle, blood vessels, and nerves freeze and form ice crystals;
- Immersion foot - If part of the body is covered with water or wet mud that is just above freezing, the area may become chronically swollen, weak, and sensitive to the cold;
- Chilblain: Red, swollen skin, usually on hands and feet, that feels hot, tender, and itchy after cold exposure.

Signs and symptoms of cold-related illnesses includes numbness in extremities (fingers, toes), loss of fine motor co-ordination, stiffness or pain, slurred speech and drowsiness, slow, irregular breathing and heartbeat/pulse, shivering.
Other health and safety problems caused by cold working conditions include:

- disease flare-ups such as asthma;
- increase in injuries due to decrease dexterity, mental skills, coordination, and cause a general decline in performance that affects safety;
- increase the risk of injuries to muscles and tendons, such as strains and sprains;
- inability to perform tasks due to restrictions from PPE;
- burns from contact with cold surfaces or substances.

7 Assessing the risk

The assessment of risk involves considering those factors which make the risk apparent and real. What is the danger to people working in this type of environment, what are some problems that might arise from performing activities in this area? The elements listed below can provide an indication of how serious the heat or cold related problems can be.

- The source of heat or cold;
- The duration of work in this type of environment;
- The nature of the work being performed;
- The level of exposure;
- The physical condition or capability of the worker;
- Past experiences dealing with this type of environment.

7.1 Heat illness

If there is a concern about heat illness occurring at work, then a risk assessment is needed. The risk matrix as outline in the University’s Risk Management Guidelines should be used to indicate the level of risk associated with the work being conducted. When assessing the risk, work practices should be assessed including the following:

- hot work areas and employees exposed to heat;
- hot working conditions/heat waves/ unusually hot conditions;
- inexperienced and unacclimatised employees;
- employees reporting possible heat illness conditions;
- first-aid and emergency procedures for workers suffering from heat collapse, heat stroke or heat exhaustion;
- employees with an increased risk of heat illness (e.g., overweight, physically unfit, feverish, have heart/circulatory/skin diseases, are dehydrated, use certain medicines). Employees considered at risk for heat illness should be assessed by a doctor if there is a concern about their fitness for working in heat.

In some occasions it may necessary to conduct a formal heat risk assessment involving the use of an accepted heat stress index (e.g. Wet Bulb Globe Temperature (WBGT)) carried out by a competent person. WBGT includes measuring environmental conditions as well as physical workload, clothing and work organisation.

If the risk assessment indicates that there is a high or medium risk associated with the hazard of working in hot conditions then control measures are required to be implemented to reduce the risk to an acceptable level.

7.2 Cold-related illness

If there are potential risks associated with cold-related illness at work then a risk assessment is needed.
When assessing the risk, work practices should be assessed including the following:

- cold work areas (such as alpine areas) and employees exposed to cold;
- inexperienced and unacclimatised employees;
- employees reporting possible cold-related illness conditions;
- first-aid and emergency procedures for workers exposed to cold;
- employees with an increased risk of cold-related illness (e.g., overweight, physically unfit, feverish, have heart/circulatory/skin diseases, are dehydrated, use certain medicines).

7.3 Thermal discomfort

First, you need to establish if there is a risk of thermal illness. For more information about assessing the risk of heat or cold-related illness occurring at work, see the previous section. Once you have established that there is no significant risk of thermal illness, the thermal discomfort issue can be addressed.

Consultation should occur with employees to establish the following:

- which employees are experiencing thermal discomfort;
- when they are effected, e.g., particular times of the day, during particular weather conditions, etc.;
- the nature of the discomfort being experienced, e.g. just too hot, too humid, too sticky, too dry, too stuffy/stifling, 'no air circulation', too wet, too cold etc.;
- what is regarded as the source or sources of the discomfort.

Generally comfortable conditions for people working indoors and doing light work (e.g. office work) are as follows:

- Air temperature (dry bulb temperature) 23-26°C;
- Relative humidity 30-60%;
- An acceptable air temperature range is regarded as 18-30°C.

8 Applying controls

The hierarchy of controls shall be used to reduce the risk of a working in hot or cold environments to an acceptable level. The hierarchy of controls includes techniques to minimise risk in the following order:

- Elimination;
- Substitution;
- Isolation;
- Redesign via engineering;
- Redesign via administrative procedures;
- Personal protective equipment.

Most often engineering controls will be the most common method of reducing the risk of heat illness. Examples of engineering controls to reduce heat exposure include:

- providing shade for outdoor work;
- shielding hot indoor sources that radiate heat (e.g., furnaces);
- enclosing the process and increasing ventilation to get rid of steam and hot air;
- increasing air movement and ventilation.

Other control measures for heat illness may include:
• altering the work schedule so heavy work occurs during cooler times;
• getting more people to help with heavy or hot work;
• providing opportunities for unacclimatised employees to acclimatise to working in heat;
• providing rest breaks in a cool, well-ventilated place;
• providing heat/sun-smart clothing and equipment for outdoor workers including cotton long sleeved shirts and trousers, wide brimmed hats, sunscreen etc.

Managers and supervisors should discuss the control measures with their staff and inform them to:

• work at a sensible pace;
• know warning symptoms and self monitor as they work;
• rest in a cool well ventilated area and drink cool fluids if symptoms occur;
• seek first aid if symptoms do not reduce rapidly.

To manage the risk associated with thermal discomfort the following can be applied:

• fixing/improving faulty/inadequate ventilation and/or air conditioning systems;
• rescheduling work or particular tasks to cooler times of the day;
• providing fans and opening doors, windows and vents where practical;
• wearing lighter and looser fitting clothing;
• providing shade for outdoor workers;
• shielding/enclosing hot processes;
• providing rest breaks in a cool well ventilated place;
• ensuring employees have free access to cool water.

Some control measures that may be considered for minimising risks of cold-related illness are;

• raise the temperature, such as setting the refrigerated room temperature to the maximum allowable, postpone outdoor work to a warmer day;
• implement warming shelters such as heated tents, cabins, break rooms, etc;
• consider decreasing the time between breaks to allow workers to warm up;
• provide protection from wind and rain.

8.1 Safe Work Procedures

Safe Work Procedures (SWP) are a suitable way to document and implement controls measures associated with a task/activity. SWP’s should be used as a way to control hazards associated with working in hot and cold environments.

8.2 Training

All staff and students with the potential for exposure to hot and cold environments, through their work or study should be trained in the hazards, risk and controls measures to protect persons from these temperatures.

8.3 Personal Protective Equipment

Personal Protective Equipment (PPE) is a method to protect a person from hot and cold temperatures. The PPE should be suited to the environment and;

• properly selected for the individual and task;
• readily available;
• clean and functional;
• correctly used when required and;
• maintained by appropriately trained staff in accordance with a personal protective equipment maintenance and servicing program.
9 Working in hot environments

There are times when tasks or activities are required to be undertaken in hot environments. These environments, i.e. deserts or tropical climates, can place people in situations of increased stress, impose limitations and risk of heat illnesses. We are more likely to be exposed to hot environments due to the nature of where we work and the types of activities we encounter.

Working in hot environments presents particular hazards which need to be considered before the worker is required to enter into the area. Sufficient planning is required to ensure that the risk management approach as detailed above can be used and implemented.

10 Working in cold environments

Working in cold environments, i.e. desert and snow conditions, can impose unique hazards and risks to a person undertaking a task/activity in this type of temperature. Sufficient planning using the risk management approach is required to ensure that people are not placed at risk in this type of environment.

11 Working in wet weather

As part of their normal duties, University outdoor staff may be required to work outside in wet weather. Working in wet weather conditions may change the nature of the hazards and risks associated with a particular job or task. To minimise the risk to staff, students and the public, the implementation of appropriate risk control is required.

Generally, the University will attempt to minimise any discomfort due to wet weather by providing appropriate personal protective equipment or alternative duties (if available).

A risk assessment and control approach is to be adopted in relation to assessment of tasks to be undertaken during wet weather, and implementation of appropriate risk control options. Risk assessment involves analysing the risks associated with wet weather tasks and evaluating them to determine steps required for risk control and priorities.

Risk assessments of any tasks to be performed during wet weather should be completed by the University outdoor staff member prior to commencing the task, with the involvement of their supervisor if there is any uncertainty or concerns regarding safety.

A task to be performed in wet weather having a risk score of ‘high’ must be discussed with the relevant supervisor, and appropriate risk control strategies implemented prior to commencement of the job.

Based on the risk assessment, hazardous tasks (i.e. risk score of high) will only be performed where the risk can be minimised to ensure an injury is prevented. If there are concerns regarding the risks presented by a wet weather task, the OH&S Unit should be contacted for assistance/advice.

Risk control measures that may be put in place with regard to working in wet weather include provision of effective & appropriate personal protective equipment, including wet weather gear.

For further information on risk management associated with working in hot and cold environments please contact the OHS Unit or consult the risk management web page.
12 Related documents

- Risk management
- Field activities
- Working Alone and After Hours Work Guideline

13 References

- Occupational Health and Safety Act, 2000
- Occupational Health and Safety Regulations, 2001
- NSW WorkCover Code of Practice - Work in Hot or Cold Environments

14 Program Review

In order to ensure that these guidelines continue to be effective and applicable to the University, the program will be reviewed regularly by the OH&S Unit and relevant stakeholders. Conditions which might warrant a review of the guidelines on a more frequent basis would include:

- An injury or near miss resulting from exposure to hot or cold environments;
- Incidents related to thermal comfort;
- Changes to codes of practice;
- Employee concern.

Following completion of any review, the program will be revised and, if necessary, updated in order to correct any deficiencies. Any changes to the program will be consulted through the OH&S Committee.