For information on
21 February 2023

Legislative Council Panel on Manpower

Guidance Notes on Prevention of Heat Stroke at Work

Purpose

To strengthen the protection of employees' occupational health, the Chief Executive announced in the Policy Address in 2022 that the Government will develop guidelines based on the Hong Kong Heat Index to require employers to take preventive measures in accordance with prescribed criteria to protect employees from heat stroke at work. This paper briefs Members on the framework and main requirements of the proposed guidance notes (GN).

Background

2. According to the general duty provisions in section 6 of the Occupational Safety and Health Ordinance (Cap. 509), an employer must, so far as reasonably practicable, ensure the safety and health at work of all his employees. It includes conducting risk assessment on heat stress and taking appropriate preventive measures to protect employees from heat stroke at work.

3. To facilitate employers to perform risk assessment on heat stress, the Labour Department (LD) issued a guide to "Risk Assessment for the Prevention of Heat Stroke at Work" in 2017. It explains in detail various risk factors that should be considered when conducting a risk assessment, and provides corresponding preventive measures against those factors for employers' reference and implementation to safeguard employees' occupational health.

4. Taking account of the increased risk of employees getting heat stroke at work as a result of the increasingly hot weather, as well as some opinions that the current risk assessment guide does not have specific requirements for heat stroke preventive measures based on heat stress indices, we consider it necessary to devise more specific guidelines, including the establishment of suitable work-rest regimens based on the Hong Kong Heat Index[1] (HKHI), so

[1] https://www.hko.gov.hk/en/wxinfo/ts/display_element_hkhi.htm

that employers can take appropriate measures with reference to specified criteria to prevent employees from heat stroke at work.

5. HKHI is a heat stress index jointly developed by the Hong Kong Observatory and the Faculty of Medicine of the Chinese University of Hong Kong. It is a heat stress index based on the Wet-bulb Globe Temperature (WBGT) Index[2]. The formula of HKHI has taken into account meteorological data such as ambient temperature, humidity, airflow and thermal solar radiation level, as well as the overall hospital admission data of Hong Kong in its calculation. Therefore, it can adequately reflect the health risks posed by different levels of heat stress to the general public in Hong Kong. In general, when HKHI at King's Park reaches about 30 or above, the public should take appropriate heat stroke prevention measures to avoid the health effects of hot weather.

Proposed guidance notes on prevention of heat stroke at work

6. LD's current guide on heat stroke prevention (see paragraph 3 above) has already provided information on heat stress risk assessment and heat stroke prevention measures. We intend to integrate and strengthen the information and content of these two aspects in the new GN. Moreover, it will additionally include recommendations on work/rest schedules when the level of HKHI is high so as to help employers/responsible persons to further reduce the risk of heat stroke when employees work in extremely hot weather. Please refer to paragraphs 7 to 21 below for the main content of the GN.

I. Risk Assessment

7. To prevent employees from heat stroke at work, employers/responsible persons should conduct appropriate risk assessments of employees' heat stress at work and take appropriate preventive measures based on the assessment results. The assessment should cover the following:

(a) Environmental factors (including airflow, air temperature, relative humidity, radiant heat, etc.);
(b) Work factors (including physical workload, work clothes, etc.); and
(c) Personal factors (e.g. heat acclimatization of employees).

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[2] WBGT Index is the heat stress assessment method adopted by the American Conference of Governmental Industrial Hygienists (ACGIH), International Organization for Standardization (ISO, BS EN ISO 7243:2017) and National Occupational Health Standards (BGZ/T 189.7-2007).

8. To assist employers in conducting heat stress risk assessment, the GN will include a sample risk assessment form and an example of risk assessment performed for employers' reference. Employers should refer to the GN and use the assessment form to conduct risk assessments for employees exposed to high heat stress at work and keep written records of the assessments.

II. General Precautions against Heat Stress

9. Employers/responsible persons should, based on the results of the risk assessment, refer to the relevant means of prevention for the identified risk factors as suggested in the GN to formulate and implement appropriate heat stroke preventive measures to reduce the employees' heat stress at work. For examples:

(a) Install temporary covers or shelters from the sun for employees to work outdoors, or provide them with sunshades such as wide-brimmed hats/safety helmets with neck covers and sun protection sleeves;
(b) Provide ventilation equipment such as blowers/mist fans, or portable waist fans;
(c) Take account of the physical workload[3] (See Appendix 1) and arrange appropriate rest breaks[4] for employees (unless more frequent rest breaks are scheduled when HKHI at King's Park reaches 30 or above, as described below);
(d) Provide shaded and ventilated resting places where employees can sit down and rest; and
(e) Arrange heat acclimatization periods for employees as necessary. Employees who have not worked primarily outdoors or in indoor workplaces without air-conditioning for more than two weeks should not spend more than 50% of their regular working hours at such workplaces on the first day; For those who have not in more than 4 weeks or ever before worked primarily outdoors or in indoor workplaces without air conditioning, they should not spend more than 20% of their regular working hours in such workplaces on the first day. Thereafter, the time can be increased by 20% daily to reach the normal working time in such workplaces in a

[3] Physical workload refers to the job categories by the American Conference of Governmental Industrial Hygienists (ACGIH), International Organization for Standardization (ISO, BS EN ISO 8996:2021) and National Occupational Health Standards (BGZ/T 2.2-2007).

[4] Under normal circumstances, a 10-15 minute break can be arranged for every 2 hours of work. However, when the weather is hot, for employees who need to do heavy or extremely heavy physical workload, the employer/responsible person should appropriately increase the rest time according to the risk-based principle; for example, arrange a rest time of 15 to 30 minutes for every 1 to 2 hours of work.

progressive manner.

10. In addition, section 16(1) of the Occupational Safety and Health Regulations (Cap. 509A) has stipulated that the person responsible for a workplace must ensure the provision of sufficient drinking water for consumption by persons employed to work at the workplace. In general, employers should provide employees with approximately 250 to 500 ml of drinking water per hour. However, when working in a hot environment, employees may lose more water due to sweating. Therefore, employers should appropriately increase the supply of drinking water in accordance with the risk assessment results.

III. Rest arrangement when HKHI reaches 30 or above

11. When HKHI at King's Park reaches 30 or above, employees working outdoors or in indoor environments without air conditioning will experience a high level of heat stress. LD reminds employers should, so far as reasonably practicable, arrange rest breaks every hour according to employees' physical workload to avoid excessive rise of employees' body temperature due to the hot working environment and physical exertion and a significant increase in the risk of heat stroke as a result. The rest arrangements do not apply to work that needs to be dealt with or performed urgently for production processes, personal and property safety or public interest, such as firefighting, emergency rescue or urgent repair work.

Rest arrangement for outdoor working environment[5]

12. When employees are required to work outdoors under direct sunlight, employers should, based on the physical workload of the employees and HKHI at King's Park, arrange for the employees to rest or suspend outdoor work according to the hourly work and rest regimen at Appendix 2.

13. If the employer/responsible person takes the following preventive measures to reduce heat stress, the rest time can be reduced accordingly:

(a) If temporary covers or shelters from the sun are set up for employees, the rest time can be reduced by 15 minutes;
(b) If employees are provided with devices that enhance airflows, such as portable waist fans, blowers, or mist fans; or, when providing

[5] Arrangement of rest time refers to the American Conference of Governmental Industrial Hygienists (ACGIH) and National Occupational Health Standards (BGZ/T 229.3-2010, GBZ/T 2.2-2007).

such equipment is not practicable, the employees are provided with cooling suits containing cooling packs or refrigeration units, the rest time can be reduced by 15 minutes;

(c) When the two measures mentioned in (a) and (b) above are adopted at the same time, the rest time can be reduced by 30 minutes in total.

14. On the other hand, some of the conditions listed below will increase the heat stress experienced by employees, and the rest time should be increased correspondingly. For example-

(a) The rest time should be increased by 15 minutes for employees who are required to wear thick work clothes/disposable protective gown/full protective clothing, which will increase heat stress on the body; or

(b) For employees who have not in more than two weeks or ever before worked primarily outdoors should have an additional 15 minutes of rest during the acclimatization period at such workplaces.

If the factors mentioned above are present at the same time, the rest time should be increased by a total of 30 minutes.

15. Employers should thoroughly consider whether employees at work have additional risks of heat stress from environmental, work and personal factors when conducting risk assessment, and increase the rest time according to the level of risk assessed.

16. In summary, employers should comprehensively consider the factors at work that justify a decrease or increase in rest time and calculate the actual hourly rest time for employees based on Appendix 2. Some examples are provided in Appendix 2(A) and Appendix 2(B) for reference.

17. Employers can also take different measures, such as changing the time to begin or end daily work and/or adjusting the time for lunch break, scheduling work tasks, etc., to avoid high physical demand work during the hotter hours of the day and reduce the need for hourly rest arrangements. Proper rotating arrangements for employees to work can also minimize disruptions to work processes. Employers should discuss and seek consensus with employees well beforehand to formulate relevant work arrangements to prepare for working in hot weather.

Rest arrangement for indoor working environment without air-conditioning

18. Even if employees work in an indoor environment, if the workplace has no an air-conditioning system, the heat stress experienced by them is still much related to the heat level in outdoor environment. Therefore, when HKHI at King's Park reaches 30 or above, employers should also arrange appropriate rest time every hour according to the physical workload of such indoor employees. Since indoor work environments do not have the radiant heat from direct sunlight, the recommended rest time is 15 minutes less than that for employees with the same workload performed outdoors under the sun. Appendix 3 sets out the detailed recommendations.

19. For some indoor work environments as listed below, the risk of heat stress posed to employees will increase. Employers should take account of the specific risk factors and increase the rest time accordingly. For example-

(a) When there are apparent heat sources or heat generating facilities in the indoor workplace, such as boilers, meat roasters, etc., the rest time should be increased by 15 minutes; or
(b) In indoor working environments lacking natural ventilation (such as renovation sites enclosed by hoardings) or confined spaces (such as chambers, tanks, etc.), the rest time should be increased by 15 minutes.

If the factors mentioned above are present at the same time, the rest time should be increased by a total of 30 minutes.

20. Similarly, if the employer/responsible person takes appropriate preventive measures to reduce heat stress, e.g. providing employees with devices that enhance airflows, such as portable waist fans, blowers, or mist fans; or, when providing such equipment is not practicable, giving the employees cooling suits containing cooling packs or refrigeration units to wear as mentioned in paragraph 13(b), the rest time can be reduced by 15 minutes.

21. Following the same principles as mentioned in paragraph 16 above, employers should consider the factors at work that justify a decrease or increase in rest time and calculate the actual hourly rest time for employees based on Appendix 3.

22. The Hong Kong Observatory will launch new service this year to add a notification function to the "My Observatory" mobile application. When HKHI at King's Park reaches 30 for the first time in a day, push messages are sent to remind the citizens to take measures to prevent heatstroke. The Hong Kong Observatory will also display the latest HKHI in on its official homepage for the public's reference. The above arrangement will facilitate employers/responsible persons to be aware that the HKHI at King's Park has reached a high level and take follow-up action.

23. If any employer believes that HKHI does not fully reflect the heat stress at the workplace for formulating appropriate heat stroke prevention measures; he can seek the assistance of occupational health professionals as appropriate to assess the relevant risks through the use of WBGT measuring instrument and recommend the necessary prevention and control measures.

Consultation

24. From November 2022 to January 2023, LD had consulted the Labour Advisory Board on the framework and main content of the new GN, and issued a consultation document to more than 3,000 occupational safety and health practitioners in Hong Kong and relevant policy bureaux/government departments inviting their comments on the GN. In addition, LD also organised three consultation sessions and two meetings during the consultation period, inviting representatives of about 100 relevant stakeholder organisations (including employer and employee associations, concerned parties and professional bodies) to attend. Generally speaking, the vast majority of opinions had no objection to LD's introduction of the GN. Views on various implementation details and future directions were put forward. We have made appropriate adjustments to some of the proposed measures having regard to the comments received.

Way Forward

25. Since the nature and requirements of different industries and job positions vary, employers and employees should adopt a risk-based and consultative approach when formulating work arrangements in hot weather with reference to the GN so as to devise reasonable and mutually acceptable plans.

26. LD aims to publish the new GN this summer and will strengthen relevant publicity and promotional activities concurrently so that employers and

employees can take appropriate measures in accordance with the requirements of the new GN during summer to reduce the risk of employees suffering from heat stroke at work.

27. We will also step up publicity and cooperate with the Hong Kong Observatory and the Occupational Safety and Health Council separately to raise public awareness on HKHI and enhance their understanding on the application of the index.

Labour and Welfare Bureau
Labour Department
February 2023

Appendix 1

Physical workload: categories and examples

Class	Examples
Resting	• Resting, sitting at ease
Light	• Sitting, standing, light arm and leg work - Light industry involves writing, typing, drawing and sewing, etc - Driving vehicle, operating foot switch or pedal, etc - Drilling of small parts, milling, coil winding, operating low power tools or machines • Jobs require walking Industry examples： Security guard, property manager, etc.
Moderate	• Sustained hand, arm, leg and/or trunk work - Hammering in nails, filing, loading, polishing, etc - Operating tractors or construction equipment - Working with pneumatic hammer, plastering - Weeding, hoeing, picking fruits or vegetables - Pushing or pulling lightweight arts or wheelbarrows • Walking with load ≤ 20 kg Industry examples： Outdoor cleansing worker, horticulture worker, recycling worker, worker at container terminals and airport apron, postal and courier service worker, electrical & mechanical service worker, transportation and delivery worker, pesticide spraying worker, disinfectant worker, chef, etc.
Heavy	• Intense arm and trunk work with hand tools or machines, or carrying heavy material - Shovelling, sledgehammer work, sawing, planning or chiselling hard material - Chipping casting, concrete block laying - Pushing or pulling heavily loaded carts or wheelbarrows • Walking briskly with load ≤ 20 kg • Walking briskly uphill or downhill with load ≤ 10 kg Industry examples： Porter, formwork worker, concrete worker, grouting worker, etc.
Very Heavy	• Conducting intense work at maximum pace • Work requires running Industry examples： Bar benders and fixers, employee undergoing physical training, etc.

Appendix 2

When HKHI reaches 30 or above
Hourly work and rest arrangement for outdoor work environment

HKHI \ Physical Workload	Light	Moderate	Heavy	Very Heavy
30 to <32		Each hour 45 min work 15 min rest (75% work； 25% rest)	Each hour 30 min work 30 min rest (50% work； 50% rest)	Each hour 15 min work 45 min rest (25% work； 75% rest)
32 to <34	Each hour 45 min work 15 min rest (75% work； 25% rest)	Each hour 30 min work 30 min rest (50% work； 50% rest)	Each hour 15 min work 45 min rest (25% work； 75% rest)	**Suspend outdoor work**
>=34	Each hour 30 min work 30 min rest (50% work； 50% rest)	Each hour 15 min work 45 min rest (25% work； 75% rest)	**Suspend outdoor work**	**Suspend outdoor work**

Appendix 2(A)

When HKHI reaches 30 or above
Hourly work and rest arrangement for outdoor work environment

Having considered all relevant factors, the rest time per hour can be reduced by 15 minutes compared to those listed in Schedule 2. For example:

- Taking a preventive measure that can reduce rest time by 15 minutes at work;
- Taking two preventive measures that can reduce the rest time each by 15 minutes at work, but at the same time, a heat stress risk factor that requires an additional 15-minute rest time is needed.

Physical Workload / **HKHI**	**Light**	**Moderate**	**Heavy**	**Very Heavy**
30 to <32			Each hour 45 min work 15 min rest (75% work； 25% rest)	Each hour 30 min work 30 min rest (50% work； 50% rest)
32 to <34		Each hour 45 min work 15 min rest (75% work； 25% rest)	Each hour 30 min work 30 min rest (50% work； 50% rest)	Each hour 15 min work 45 min rest (25% work； 75% rest)
>=34	Each hour 45 min work 15 min rest (75% work； 25% rest)	Each hour 30 min work 30 min rest (50% work； 50% rest)	Each hour 15 min work 45 min rest (25% work； 75% rest)	**Suspend outdoor work**

Appendix 2(B)

When HKHI reaches 30 or above
Hourly work and rest arrangement for outdoor work environment

Having considered all relevant factors, the rest time per hour can be reduced by 30 minutes compared to those listed in Schedule 2. For example, taking two preventive measures that can each reduce the rest time by 15 minutes.

Physical Workload / HKHI	Light	Moderate	Heavy	Very Heavy
30 to <32				Each hour 45 min work 15 min rest (75% work； 25% rest)
32 to <34			Each hour 45 min work 15 min rest (75% work； 25% rest)	Each hour 30 min work 30 min rest (50% work； 50% rest)
>=34		Each hour 45 min work 15 min rest (75% work； 25% rest)	Each hour 30 min work 30 min rest (50% work； 50% rest)	Each hour 15 min work 45 min rest (25% work； 75% rest)

Appendix 3

When HKHI reaches 30 or above
Hourly work and rest arrangement for indoor work environment without air-conditioning

HKHI \ Physical Workload	Light	Moderate	Heavy	Very Heavy
30 to <32			Each hour 45 min work 15 min rest (75% work； 25% rest)	Each hour 30 min work 30 min rest (50% work； 50% rest)
32 to <34		Each hour 45 min work 15 min rest (75% work； 25% rest)	Each hour 30 min work 30 min rest (50% work； 50% rest)	Each hour 15 min work 45 min rest (25% work； 75% rest)
>=34	Each hour 45 min work 15 min rest (75% work； 25% rest)	Each hour 30 min work 30 min rest (50% work； 50% rest)	Each hour 15 min work 45 min rest (25% work； 75% rest)	**Suspend work**