Adapting to the Heat

Existing Global Responses for Workers Protections in Construction, Building Materials, Wood and Forestry Industries

BWI
Building and Wood Workers' International
www.bwint.org

HEAT UP WORKERS' RIGHTS NOT THE PLANET

Contents

BWI is the Global Union Federation grouping free and democratic unions with members in the Building, Building Materials, Wood, Forestry and Allied sectors.

BWI brings together around 360 trade unions representing around 12 million members in 117 countries. The Headquarters is in Geneva, Switzerland while the Regional Offices are in Panama, Malaysia, and South Africa.

Our mission is to defend and advance workers' rights, and to improve working and living conditions in our sectors. The BWI, above all, has a rights-based approach. We believe that trade union rights are human rights and are based on equality, solidarity and democracy, and that trade unions are indispensable to good governance.

BWI goals include 1) to promote and defend human and trade union rights; 2) to increase trade union strength; 3) to promote a stable and high level of employment in our sectors; and 4) to influence policy and strengthen the capacity of institutions and tripartite structures in our sectors.

 Written by A. Oates. This report is made possible with the support of the Laudes Foundation.

Foreword

Uniting for Change: Global Campaigns for Safer Work Environments amidst Climate Challenges

In 2023, with the biggest spikes in temperatures attributed to the climate crisis, under the slogan "Heat-up Workers' Rights, Not the Planet!" Building and Wood Workers' International (BWI) launched a campaign on the importance of health and safety under extreme heat and extreme weather conditions. The campaign also seeks to support efforts by affiliates to obtain better jobs and conditions for workers in the context of the climate emergency.[1]

Over time, more information will be available to help ensure that workers lives, and health are protected from heat stress. Improving occupational health and safety is always a "work in progress".

Far too many workers in our sectors are not free to organise and bargain. Those workers face the dismal choice between risking their lives or losing their jobs. They cannot defend their health, and many are condemned to die in silence.

This year, for International Workers' Memorial Day 2024, BWI is shining the spotlight on the risks to workers' lives in the construction, building materials, wood and forestry sectors, including from extreme heat, under the theme "Enough is Enough: Let's Talk Hazards".[2]

Eighty-one countries have ratified the International Labour Organization's Convention on occupational health and safety (ILO C155 – Occupational Safety and Health Convention, 1981) accepting the obligation to provide that workplaces are safe and without risks to health. In 2022, the ILO recognised that a safe and healthy working environment is a Fundamental Principle and Right at Work.

In July 2022, the United Nations General Assembly recognised the right to a clean, healthy, and sustainable environment as a universal human right. The effective protection of this right could not be more urgent as the impact of climate change and extreme weather events is already disproportionately felt by those made vulnerable by social and economic injustices.

In the construction sector, BWI and its affiliates' engagement has been instrumental in achieving a revised ILO Code of practice on safety and health in February 2022. This considers new areas which require improved health and safety practices and other protective measures, including those related to heat stress. In 2023, the International Labour Conference (ILC) adopted a resolution with social partners in which governments commit to "Urgently implement occupational safety and health measures for all workers impacted by climate-related risks and extreme weather events addressing the consequences on mental and physical health and promoting safe and healthy working environments; (Art. III. 21. u.)". But is clear that more needs to be done if words are to become action.

In the run up to the UN Climate Summit (UNFCCC COP28 Conference) BWI was again calling on governments and employers to act to both slash carbon emissions and boost climate adaptation, including by addressing the impact of extreme heat on workers in the construction industry.[3]

This report aims to help BWI affiliates engage with employers and governments to protect workers from exposure to high temperatures at work. It is based on the experience of BWI affiliates. We would like to thank them as well as other organisations who provided information for this report.

Ambet Yuson
BWI General Secretary

1 Call to Action: Heat Up Workers' Rights, not the Planet! |BWI Home (bwint.org)
2 www.bwint.org/cms/call-to-action-for-iwmd-2024-enough-is-enough-let-s-talk-about-hazards-3105
3 Policy paper: Protecting migrant workers in an overheating planet |BWI Home (bwint.org)

1. Heat and Hazards: Navigating New Normals in Workplace Safety

The last eight years were the hottest on record, with 2023 experiencing global temperatures 1.45ºC above pre-industrial times, nearing the critical 1.5ºC limit warming limit set by international agreements.[4]

This period of human-induced global warming has introduced unprecedented changes to our climate, making extreme weather events, including frequent heatwaves, the new normal. Notably, 2023 brought record temperatures to regions unaccustomed to such extremes, such as southern Europe, North Africa, and the UK, which reached 40°C for the first time.[5] In response to a deadly heatwave in 2022, Oregon introduced specific heat stress provisions into its legislation.[6]

These extreme temperatures are reshaping our work and living environments, posing severe, often life-threatening conditions for workers, particularly in outdoor sectors. For instance, the Eurofound research organization reports that 23% of workers across the European Union are exposed to high temperatures during a quarter of their working hours, a figure that rises to 45% among construction workers.[7]

The risks associated with working in high temperatures are significant. Temperatures above 30°C increase the likelihood of work-related accidents by 10% to 15%, and above 38°C, the risks escalate further.[8] According to the French National Institute for Research and Safety, temperatures starting from 28°C in construction sites pose risks, becoming dangerous above 33°C.[9] Exposure to such conditions not only raises the chance of heatstroke but also exacerbates other medical conditions such as heart disease and high blood pressure, due to increased cardiac load.

Particularly vulnerable are pregnant women, with new studies from India indicating that working in extreme heat can double the risk of stillbirth and miscarriage.[10] Moreover, heat stress impacts the body's ability to process chemicals, potentially worsening their toxic effects.[11]

While past policies primarily focused on cold weather, today's concerns centre on heat. Governments are beginning to propose legal measures to protect workers from high temperatures, but urgent action is required to prevent further fatalities.[12] For example, the Heat Trap project highlighted the tragic deaths of workers in Spain and France due to heat exposure.[13]

There is a compelling moral, legal, and economic argument for employers to address heat stress proactively. As noted by a UK union official, overheated workers are far from their best, impacting productivity.[14] The French risk prevention agency OPPBTP emphasizes the necessity of safeguarding worker health to maintain business continuity, noting that high temperatures also threaten machinery and tools, leading to operational and financial setbacks.[15]

The impact of heat stress is profound, with projected losses in global working hours expected to reduce worldwide productivity and potential income globally. This report outlines existing legislative measures, collective bargaining agreements, and other initiatives from around the world aimed at mitigating extreme heat risks in the construction, building materials, wood, and forestry sectors, demonstrating a growing recognition of the need to adapt to our changing climate.

4 https://library.wmo.int/viewer/68835/download?file=1347_Statement_2023_en.pdf&type=pdf&navigator=1
5 https://www.metoffice.gov.uk/about-us/news-and-media/media-centre/weather-and-climate-news/2022/record-high-temperatures-verified
6 Mapping the hottest temperatures around the world | Infographic News | Al Jazeera
7 Rising temperatures pose serious risks to workers' health | European Foundation for the Improvement of Living and Working Conditions (europa.eu)
8 https://www.etuc.org/en/pressrelease/schmit-tells-bosses-protect-workers-extreme-heat
9 Bill n°1587 - 16th legislature - National Assembly (assemblee-nationale.fr)
10 https://www.bbc.co.uk/news/world-asia-india-68575943
11 https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---lab_admin/documents/publication/wcms_887111.pdf
12 https://www.assemblee-nationale.fr/dyn/16/dossiers/code_travail_rechauffement
13 Heat is killing workers in Europe – and the EU is dragging its feet on legislation | FAME Lab
14 workers-need-protection-soaring-temperatures.pdf (gmb.org.uk)
15 High Heat and Heat Waves on Construction Sites - Recommendations Guide - Construction prevention (preventionbtp.fr)

The Health Implications of Working in Extreme Heat

Extreme heat events at the workplaces can cause:[16]

- **Heat stroke** – the most serious heat-related illness. It occurs when the body can no longer control its temperature and is a medical emergency. It can cause permanent disability or even death if the person does not receive emergency treatment;
- **Heat exhaustion** – the body's response to an excessive loss of water and salt which can lead to heat stroke if left untreated;
- **Rhabdomyolysis (rhabdo)** – a medical condition associated with heat stress and prolonged physical exertion. It causes rapid breakdown, rupture and death of muscle which releases electrolytes and large proteins into the bloodstream. This can cause irregular heart rhythms, seizures and kidney damage;
- **Heat syncope** – a fainting episode or dizziness;
- **Heat cramps;**
- **Heat rash;**
- **Heat oedema** – swelling that generally occurs among people who are not acclimatised to working in hot conditions.

Working in high temperatures can also:

- Increase the risk of accidents injuries due to fatigue, lack of concentration, and poor decision making as well as sweaty palms, fogged-up safety glasses, dizziness and reduced brain function. Some measures to reduce heat stress can also lead to higher accident risks – moving to night work to avoid the hottest periods of the day, for example, can lead to reduced concentration and speed of reflexes or reduced visibility;
- Increase stress levels and affect mental health;
- Result in higher exposures to chemicals;
- Increase the levels of air pollution and harmful exposures to workers;
- Worsen chronic conditions such as cardiovascular disease, respiratory disease, cerebrovascular disease (conditions that affect blood flow to the brain) and diabetes-related conditions.

While the evidence is not conclusive, some heart, kidney and liver damages are thought to be linked to long-term heat exposure and it has also been associated with temporary infertility in men and women.

The Economic Impact of Heat Stress and the Case for Taking Action

As global temperatures rise, businesses are beginning to recognize the significant economic consequences of heat stress on productivity and worker safety. Recent studies have shown that high temperatures can have a direct impact on productivity, leading to reduced efficiency and increased health risks. The Loughborough University and FAME lab study from 2018, for example, titled *"Workers' Health and Productivity Under Occupational Heat Strain"* underscores the direct link between heat stress and productivity losses. The study, which analysed data from 111 studies across 30 countries, found that 30% of workers reported productivity declines due to heat stress. On average, productivity dropped by 2.6% for every degree increase above 24°C Wet Bulb Globe Temperature (WBGT), indicating a tangible economic cost for employers.[17]

Additional research has highlighted the importance of rest, shade, and hydration (RSH) programs as a means to combat productivity loss due to heat stress. For instance, the Adelante Initiative and Prevention, Resilience, Efficiency, and Protection (PREP) programs by La Isla Network demonstrated that simple workplace interventions could lead to significant gains in productivity.[18] Specifically, these interventions led to a 72% reduction in injuries, a 94% reduction in worker hospitalizations due to heat stress, and a 20% increase in productivity, translating into an impressive 22% return on investment (ROI) - for every $1 invested, there was a $1.22 return. This ROI underscores the economic advantage for employers who take proactive steps to address heat stress. A recent study in

16 European Agency for Safety and Health at Work (EU-OSHA) guidance for workplaces, Heat at Work – Guidance for workplaces (2023), https://oshwiki.osha.europa.eu/en/themes/heat-work-guidance-workplaces
17 www.lboro.ac.uk/media-centre/press-releases/2018/december/hot-conditions-productivity-health/
18 New film shows toll of heat stress on workers, plus world-leading protections developed in Nicaragua – La Isla Network

Nicaragua found that implementing RSH intervention program not only maintained productivity, but actually increased it, even with reduced total working time. This intervention led to a 19% increase in productivity for seed cutters and a 9% increase for burned cane cutters.[19]

The global economic impact of heat stress is projected to be enormous. According to the ILO, with a 1.5°C temperature rise by 2050, 2.2% of global working hours (equivalent to 80 million full-time jobs) will be lost due to heat stress. However, if emission reductions fall short and temperatures rise beyond 1.5°C, this could result in a 3.8% loss of worldwide working hours – equivalent to 136 million full-time jobs.[20]

In 2022, an estimated 490 billion potential labour hours were lost due to heat stress, a 43% increase from 1991-2000 average. This loss equates to about $863 billion in potential income globally. By 2031, economic losses due to heat stress are project to soar to $2.4 trillion, disproportionately impacting lower-middle and low-income countries.[21]

The Role of Collective Bargaining

In the face of increasing heat stress, and given the significant economic case for action, collective bargaining and union engagement are not only critical for workers' health and safety, but also essential for maintaining economic stability. Unions in building, construction, wood and forestry, can negotiate for better employment protection, as well as safety measures, such as rest breaks, shaded areas, and hydration stations. Collective agreements can also ensure that employers are accountable for implementing these safety measures, ultimately protecting workers' health while maintaining productivity.

The economic impact of heat stress is significant, but so are the potential benefits of implementing effective OSH measures. By addressing heat stress through continuous advocacy, social dialogue, collective bargaining, comprehensive safety programs, and specific protections for vulnerable categories of workers, businesses and unions can work together to create a safer, more equitable industry and to improve productivity.

19 Impact of heat and a rest-shade-hydration intervention program on productivity of piece-paid industrial agricultural workers at risk of chronic kidney disease of nontraditional origin | Annals of Work Exposures and Health | Oxford Academic (oup.com)

20 International Labour Organization (2019). Working on a warmer planet, the impact of heat stress on labour productivity and decent work. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_711919.pdf

21 Ibidem., Further references in Policy paper: Protecting migrant workers in an overheating planet |BWI Home (bwint.org)

Overview Table: **Provision for Working in Extreme Heat**

The following table provides a summary of examples of provisions for working in heat extremes set out in this report:

Country	Work stoppages	Payment of wages for lay-offs	Employers required to take specific action where workplace temperatures are high	"Heat delay" clauses in construction	Instruments [i]
Austria		x			CBA
Belgium			x		NL
Cyprus			x		NL R/G
France	x*	x	x		NL* (proposed) R/G
Germany		x			CBA
Greece	x		x		CBA MI R/G
Hungary			x		NL
Italy	x	x	x		RL
Latvia			x		NL
Luxembourg		x			NL
Malta			x		R/G
Montenegro			x		NL
Slovenia			x		NL
Spain	x		x		CBA NL JP
Sweden			x		CBA
Switzerland			x		R/G
United Kingdom			x		R/G
Australia	x		x		CBA R/G
Brazil			x		NL JP
Canada			x		PL CBA
China	x				NL
Costa Rica			x		NL
The Gulf States	x				NL IFAs
New Zealand			x		R/G
South Africa			x		NL R/G
South Korea			x	x	R/G NL
Thailand			x		NL
United States			x		SL R/G CBA

i Collective Bargaining Agreements (CBA), National Legislation (NL), Ministerial Instruction (MI), Regional, State, or Provincial/Territorial Legislation (RL/SL/PL) Recommendations/Guidelines (RG), Joint employer/union protocol (JP)

2. Regulatory frameworks for Work Stoppage in Extreme Heat Conditions

As climate change increases global temperatures, unions are demanding action from both governments and employers to protect workers from extreme heat, and particularly allowing work to be suspended when the temperature reaches a particular level.

When workplaces get too hot it is more than just an issue about comfort. If the temperature is too high it can become a health and safety issue. In very hot conditions the body's blood temperature rises and if it rises above 39 °C, there is a risk of heat stroke or collapse. Delirium or confusion can occur above 41°C. Blood temperatures at this level can prove fatal and even if a worker does recover, they may suffer irreparable organ damage.[22]

This section looks at examples of collective bargaining agreements and regional and national legislation, including proposed laws ministerial instructions, that allow workers to stop working when it gets too hot:

- In Spain, the general collective agreement for the construction sector prohibits work at certain times of the day during the summer months;
- In Australia, collective agreements set out that workers should not work in extreme high temperatures. In the Greater Melbourne area, this is when the temperature reaches 35ºC;
- In Greece, the national collective agreement for the construction and related industries sector provides that when temperatures rise above 38°C in the shade, work activity must be stopped without a reduction in the daily wage. A July 2023 Ministerial Decision also included the mandatory cessation of work in areas where the risk of heat stress becomes extremely high between 12pm and 5pm;
- Several Gulf State countries have introduced bans on work during the hottest part of the day, often between noon and 3pm and in the months of July and August;
- China's administrative measures on the prevention of heatstroke require outdoor work to stop if the temperature reaches 40°C;

- Three Italian regions have banned agricultural work between 12.30pm and 4pm in the summer; and
- In France, a proposed law would allow workers to stop work temporarily if Level 4 weather warnings are activated.

Collective Agreements

In Working on a warmer planet, the ILO highlights the importance of collective agreements as a tool for re-negotiating work methods and organisation, hours, dress codes, equipment, working hours and rest times, and even maximum temperature values, for work in extreme heat.[23]

22 Temperature.pdf (tuc.org.uk)
23 https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_711919.pdf

Spain's Collective Bargaining Approach to Heat Safety in Construction

In Spain, construction collective bargaining agreements set out timetables for prohibiting work in the afternoon for one or two summer months.

The general collective agreement for the construction sector provides, in Article 166, that when temperatures are extreme, particularly during heatwaves which have serious consequences for health, union representatives can propose different times to avoid the hottest periods of the day.

The general agreement can be supplemented by local agreements. Those in areas particularly affected by extreme heat, including Andalusia and Extremadura, contain more detail on time limitations during the summer months.

The southern autonomous communities plan uses the jornada continua (or jornada continuada or jornada intensiva). Work is carried out continuously before 3pm to avoid exposure to heat during the hottest period of the day.

The following are examples of the jornada continua in Andalusia in 2018:

- **Malaga**: 7.30am to 2.30pm Monday to Friday for 40 working days (from 9 July to 31 August);
- **Seville**: 7.30am to 2.30pm from 25 June to 31 August;
- **Cadiz**: 7.30am to 2.30pm Monday to Thursday and 7.30am to 12.30pm Friday, from 1 July to 31 August.

In Extremadura, between 12 July and 12 August 2022 the provincial agreements in Badajoz and Cáceres reduced the working day to seven hours. From 2021, the intensive day in Madrid applies from mid-July to mid-August.

Spanish unions have asked workers to call out employers who are not complying with the jornada continua. They also pledged to will ensure the reduction in working time is respected and report any violations to labour authorities.[24]

Regulating Heat Risks in Australia's Construction Sector: Enterprise Agreements and Weather Clauses

The Inclement Weather Clause, Clause 30, sets out establishes the conditions under which payment for periods of inclement weather are made. The definition of inclement weather includes extreme high temperature where it is either not reasonable or not safe for employees to continue working.

Under the Agreement, temperatures of or above 35°C are defined as constituting "inclement weather" for work in the Greater Melbourne area.

When the temperature is expected to be 35°C or more, or approaches 35°C, the parties on site shall confer regarding the performance of work.

If work has ceased for two consecutive days due to hot weather and the Bureau of Meteorology (BOM) has forecast that the temperature will reach 35°C on the following day, and has also forecast a cool change for that day, the employees on site on that day will remain in air-conditioned amenities for one and a half hours after the temperature reaches 35°C. If the temperature drops to below 33°C, they will return to work.

The Parties will also adopt this procedure for any subsequent days where the BOM forecasts the temperature will reach 35°C or more.

Temperature will be measured by the nearest automatic Melbourne Bureau of Meteorology Monitoring Station unless otherwise agreed between onsite management and employee representatives at the start of each project.[25]

- ***Building and Construction General On-site Award 2020***

The Building and Construction General On-site Award 2020, clause 24, deals with inclement weather in the general building and construction and the civil

24 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf
25 Building and Wood Worker's International

construction sector.[26] Inclement weather includes extreme high temperature that means it is not reasonable or is unsafe for employees to work.

When inclement weather conditions exist, an affected employee is not required to start or continue to work where it is unreasonable or unsafe to do so (with the exception of emergency work or work required to complete a concrete pour, as long as there is not imminent risk to their health and safety).

Where an employee is not able to perform any work at any location because of inclement weather, they will receive payment at the ordinary hourly rate for ordinary hours. Payment for time lost due to inclement weather is subject to a maximum of 32 hours pay in any four-week period for each employee (and on a pro-rata basis for part-time workers).

The Construction, Forestry, Mining and Energy Union (CFMEU) has "firm policy" that in Melbourne, 35ºC is "extreme high temperature" and it is neither "reasonable" or "safe" to continue construction work.

"Unless your workplace is artificially cooled you can cease work at this temperature," it advises its members.

Special circumstances, including work on a reflective roof can lead to workers being "heated off" well below 35ºC, it adds.

It is CFMEU policy that people working in direct sunlight should relocate under cover at 32ºC.

It warns that any employer breaching the Award will be penalised.[27]

Greece's Protective Measures in Construction and Ship Repair under Extreme Heat

In Greece, collective agreements prohibit work during the hottest time of the day when a certain air temperature is reached. The national collective agreement for the construction and related industries sector provides that in the event of temperatures above 38°C in the shade, work activity must be stopped without a reduction in the daily wage.

The collective agreement for workers in the construction sector and ship repair (in the local agreement of the Prefectures of Piraeus, Attica and the Islands) indicates that when the EMY national meteorological service of Greece reports a temperature of 36°C and 37°C, work is suspended from 2pm to 6pm. From 38°C, work is suspended from 1pm to 7pm. Working

hours must be between 7am and 1pm, without any reduction in daily wages. Work may resume after 6 or 7 p.m.

The Pireaus shipbuilders' union provides an EMY-certified thermometer to allow measurements to be taken at 10am and the above measures applied.[28]

National Legislation

Heat Safety Protocols in the Gulf States: Legislative Bans and Worker Protection during Summer Months

In these countries, the temperature can reach very high levels of up to 55°C and humidity levels can rise above 80%. Several countries have adopted bans on working outside at specific times of the day and during a specific period of summer, with sanctions for non-compliance that include prison sentences in Oman.

The bans generally concern a few hours during the hottest part of the day, often between noon and 3pm, and in the months of July and August, although this varies slightly from country to country:

- **Bahrain**: 1 July to 31 August; 12pm to 4pm;
- **Saudi Arabia**: 15 June to 15 September; 12pm to 3pm;
- **Oman**: 1 June to 31 August; 12.30pm to 3.30pm;
- **Kuwait**: 1 June to 31 August; 11am to 4pm;
- **United Arab Emirates**: 15 June to 15 September; 12:30pm to 3 pm.

In 2021, Qatar made significant changes to its work ban. Outdoor work must be suspended between

26 FWO - Award Viewer - MA000020 (fairwork.gov.au)
27 Building and Wood Worker's International
28 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf

10am and 3.30pm from 1 June to 15 September. It also introduced a work break regardless of the time and the month if the WBGT Index (see Appendix) exceeds 32.1°C in the workplace.

Employers must provide annual health check-ups to diagnose and manage chronic illnesses likely to contribute to the risk of heat stress. Workers must not be charged for the medical examination and employers must keep records of the examinations.

The Eurogip report, *Working in high heat and heatwaves*, highlights criticisms of this approach. It points out that if the air temperature is 40°C and humidity 60% at 3pm, for example, it is likely that these conditions will be the same at 3.15pm. In addition, the provisions apply over two or three months on average, but there are periods of extreme heat beyond the summer months. The Vital Signs Partnership Report (2023) says that in most parts of the Gulf, there are between 100 and 150 days when maximum daily temperature exceeds 40°C. There is also a huge problem with lack of enforcement and inadequate protective measures, placing workers at risk of fatal heat-related illnesses and injuries.[29]

China's Administrative Measures on Preventing Heatstroke in the Workplaces

China introduced administrative measures on the prevention of heatstroke (AMHP 2012) in June 2012. If the temperature reaches 40°C, outdoor activities should be stopped for the entire daytime period. If the temperature is between 37°C and 40°C, the employer must ensure that employees do not work outdoors for more than six hours in total throughout the day, and continuous working time should not exceed national regulations. The employer must not organise outdoor work during the hottest three-hour period of the day.

If the temperature is between 35°C and 37°C, the employer must adopt measures such as shift rotation to shorten continuous working time and must not organise overtime for outdoor workers. Where work is suspended or reduced, employers must not reduce workers' wages.

Ministerial instruction

Mandated Work Stoppages and Protective Measures during Extreme Heat

In July 2023, the Ministry of Labour and Social Security issued Ministerial Decision (No.65581) listing emergency measures to prevent heat stress among private sector workers during the "Cleon" heatwave. These include the mandatory cessation of work in areas where the risk of heat stress becomes extremely high between 12pm and 5pm.

It also set out:

- the provision of teleworking (homeworking) for private sector workers in high-risk groups;
- measures to organise working time and facilitate workers' arrival and departure from work;
- technical and organisational measures to prevent heat stress; and
- specific provisions for outdoor work and the provision of personal protective equipment (PPE).

An accompanying circular on the protection of health of vulnerable workers set out provisions for special leave in areas where temperatures are 40°C or above, and teleworking is not possible due to the nature of the work. In cases of unavoidable inability to attend work for reasons due to adverse weather conditions, and if a recommendation to limit travel has been issued, employees may be granted special leave of up to two working days per calendar year. In certain circumstances they may be excused from their duties, on production of a medical certificate.

The circular explains that vulnerable groups are: employees aged 60 and over; cancer patients undergoing treatment for cancer; and people with serious neurological and mental illnesses, multiple sclerosis and epilepsy.[30]

Regional Legislation

Heatwave Work Bans and Labour Rights in Italian Agriculture

Three Italian regions including Puglia, have banned agricultural work between 12.30pm and 4pm in the summer, following extensive campaigning by FLAI-CGIL, the largest Italian agricultural workers' trade union. However, it has been reported that many employers ignore the regulations, and a lack of enforcement means employers do not take up the option of furloughing workers in cases where temperatures exceed 35°C, as the law allows.[31]

In July 2023, as temperatures in Italy exceeded 40ºC, workers across Italy threatened to go on strike and unions called for the reintroduction of the furlough scheme introduced during the Covid pandemic to keep workers safe during the extreme heat.[32]

29 https://vitalsignsproject.org/research/report-3/
30 https://en.rua.gr/2023/07/12/heat-wave-cleon-authorities-introduce-emergency-measures/ Dr Christina Theochari Civil and Environmental Engineer ECTUN Coordinator Head of Environment and International Relations Department Athens Labour Unions Organization
31 https://www.heattrapproject.com/italy-investigation/
32 https://www.business-humanrights.org – Italy: 5 workers die from extreme heat as factory workers & labourers call for furlough

Proposed National Legislation

Advancing Heat Safety Legislation in France: From Worker Breaks to National Heatwave Warnings

A draft law has been under consideration in the French Parliament since 20 July 2023. This would adapt the French Labour Code to the consequences of global warming.[33] The proposals include legal provisions to:

- allow workers to stop work temporarily if Level 4 weather warnings are activated;
- limit working hours to six hours a day when a Level 3 weather alert is activated;
- introduce a 20-minute break every two hours, without loss of pay, in the event of temperatures above 33°C in an indoor or outdoor workplace;
- provide 10 consecutive minutes of rest every two hours, without loss of pay, if the temperature exceeds 28°C in an outdoor workplace or 30°C in an indoor workplace.

There are four levels of heatwave warning in France. A Level 4 (red) warning is when heat is exceptionally long-lasting, intense and widespread. It was introduced in 2004 and by August 2023 France had declared a red alert for heatwaves seven times: twice in 2019, once in August 2020, twice in 2022, and again in August 2023.[34]

A Level 3 (orange) alert is issued when a heatwave is forecast. The exact criteria vary by department (area of the country), but the danger point is typically when temperatures reach a certain level for three days in a row and fail to drop significantly at night. In Lyon, for example, three days at 35°C and three nights at 21°C triggers an orange alert. Authorities also take into account factors like air pollution and humidity that could make lower temperatures more dangerous.[35]

The Bill before the parliament aims to implement the ETUC demand for the establishment of "maximum working temperatures". [36]

The French Labour Code already requires employers in construction and public works to make available to workers at least three litres of water per day per worker (article R. 4534-143) and ensure that personal protection and safety equipment are compatible with high temperatures. Article R. 4153-36 prohibits assigning young people to work exposing them to extreme temperatures likely to harm their health.[37]

33 https://www.assemblee-nationale.fr/dyn/16/dossiers/code_travail_rechauffement Loïc Lerouge, Director of Research at the French National Centre for Scientific Research (CNRS), University of Bordeaux, France
34 https://www.rfi.fr/en/france/20230823-what-is-france-s-heatwave-warning-system-and-how-does-it-work
35 https://www.rfi.fr/en/france/20230823-what-is-france-s-heatwave-warning-system-and-how-does-it-work
36 https://www.assemblee-nationale.fr/dyn/16/dossiers/code_travail_rechauffement
37 https://www.assemblee-nationale.fr/dyn/16/dossiers/code_travail_rechauffement


HYUNDAI

3. Employers' requirements for Workplace Adaptations for Worker Safety in Extreme Heat

As well as stopping work completely when workplace temperatures soar, employers should assess the risks of any work that continues and put in place measures to protect workers. Several countries now have legislation requiring employers to put into place specific technical and organisational measures when the temperature reaches a certain level. These include adapting work processes, changing working time by altering start and finish times or providing more rest breaks, providing shade, sun protection and cool drinks, acclimatising workers to the heat, and minimising physically demanding tasks.

Examples of national, state, provincial and territorial laws, collective agreements at both national and international level, joint union and employer protocols, and recommendations and guidelines from regulators and other organisations are set out here.

These include the following preventative measures:

- Provide air cooling equipment (Sweden);
- Provide an adequate supply of drinking water and information on how to avoid heat stroke and sunburn (Qatar);
- Provide breaks in shaded areas, avoid the hottest periods of the day, and do not allow lone working during heatwaves (Spain and Brazil);
- Limit presence at the workstation and plan rest times (Belgium and Canada);
- Alternate work and rest and temporarily suspend work under conditions of high temperature and humidity (Cyprus);
- Carry out risk assessments to identify preventative measures (France and Spain);
- Provide health surveillance focused on kidney health and function (Costa Rica);
- Certify workers as fit to work in high temperatures (South Africa);
- Obey three basic rules for outdoor work on shade, water and rest (South Korea);
- Create Heat Illness Prevention Plans (HIPPs) (US).
- Reduce or stop particular work activities in areas particularly exposed to heat (Greece and Spain);
- Acclimatise workers (Italy and South Africa);
- Emergency planning and response (Italy);
- Assess humidity levels (Malta);
- Use a recognised occupational safety specialist to assess the work situation when the air temperature reaches a certain level (Switzerland);
- Carry out a detailed heat stress risk assessment (UK);
- Assess exposure to solar ultraviolet radiation (Australia);
- Carry out health checks prior to carrying out a specific task (New Zealand);
- Provide heatstroke bracelets to construction workers (France).

Collective Agreements

Air Cooling Mandates in Sweden: The Tower Crane Operators' Agreement

The Swedish tower crane operators' collective bargaining agreement requires the employer to equip the crane with air cooling equipment if the inside temperature of a mobile or tower crane exceeds the recommendations of the Swedish Work Environment Authority. A portable air conditioner meets this requirement.[38]

Qatar: Comprehensive Heat Safety Measures in BWI-BESIX International Framework Agreement

BWI has an International Framework Agreement (IFA) with the BESIX Belgian construction company that includes two provisions related to climate adaptation. The agreement enabled BWI and affiliates in Belgium to engage with Six Construct, BESIX's subsidiary in the Middle East, to promote the rights of workers in Qatar, the United Arab Emirates, and other countries in the Gulf and Africa, including in relation to heat stress and occupational safety and health (OSH).

38 entreprenadmaskinavtalet-2023-2025.pdf (me.se)

Six Construct was the main contractor for the construction of two stadiums for the 2022 FIFA World Cup in Qatar. The agreement included providing an adequate supply of wholesome drinking water and information on how to avoid heat stroke and sunburn.

Four joint employer and union inspections carried out between 2017 and 2019 emphasised heat stress as a matter of serious concern on construction sites in Qatar, with links to occupational illnesses, injuries and fatalities.

BWI and affiliates were able to support improvements in working practices and OSH, including the provision of cool and shaded rest areas, water stations with cool water and rehydration salts, and mandatory water bottles and cooling gear for each worker. They also discussed how to adjust working time and shift patterns so work took place outside peak hours and supported efforts to adapt safety helmets to the heat and encourage workers to wear them.

Qatar: Heat Stress Prevention programme scrutinised via BWI-VINCI-QDVC International Framework Agreement

The agreement between BWI, the Qatari shareholding company QDVC, and the Vinci construction company also provides a good example of health and safety provisions related to heat.

The "Heat Stress Prevention programme" is part of a yearly plan to provide workers with extra training and implement special measures during the summer period. Special measures are activated based on a heat index and include, for example: stop working when the WBGT (see Appendix) exceeds 32.1°C, adapt working hours and suspend work during hottest hours of the day, and take extra breaks in shaded and ventilated areas.[39]

Joint Employer/Union Protocols

Collaborative Heat Safety Protocols in Spain's Construction Industry

In July 2023, the UGT FICA construction and agricultural workers' union, the National Construction Confederation employers' organisation, and the CCOO Hábitat general workers' union signed a joint action protocol regarding high temperatures in the construction industry. This includes recommendations regarding:

- scheduling breaks in shaded areas;
- adapting work schedules to the hours of least heat exposure;
- not working alone in the event of an orange or red heatwave alert;
- adequate sun protection;
- carrying out tasks involving greater physical effort during times of lower heat exposure;
- the guaranteed supply of fresh, potable water;
- air conditioning in welfare facilities;
- adequate PPE;
- information on how to identify and act on heat stroke; and
- training for workers on first aid and emergency measures in case of heat stroke.

39 https://www.bwint.org/cms/new-bwi-report-social-dialogue-and-collective-bargaining-in-the-green-transition-3046

It recommends that companies use warnings issued by the State Meteorological Agency National Plan for Prediction and Monitoring of Adverse Meteorological Phenomena to plan outdoor work and in risk assessments, in order to take appropriate measures to protect workers against risks related to extreme high temperatures.

It also recommends:

- the person responsible for the work consults the weather forecasts daily;
- information about the risk level is indicated on the construction notice board and workers are informed of the forecast before starting work;
- preventative measures including work rotation and the provision of shade;
- special attention is paid to new workers and those who have returned to work after a prolonged period of absence; and
- increased breaks in cool areas.

Where an orange or red alert has been issued, the risk of exposure for outdoor work cannot be reduced or eliminated, and the previous preventive measures or those contained in the company's occupational risk assessments do not guarantee the protection of workers, the adaptation of working conditions is mandatory, including a reduction or modification of hours.

Occupational risk assessments must also take into consideration the characteristics of the task being carried out and the personal characteristics and medical state of the worker.

If the company proposes a resumption of work that means ending the working day later than the initially planned schedule, the worker representative must be consulted and the carrying out of work outside ordinary hours must have the express consent of the worker.

Where a worker is not able to change their work schedule due to family, personal and work life, they must not be subject to any type of disciplinary procedure, without prejudice to the fact that the worker must recover the time not worked within the terms set out in the protocol.[40]

Heatwave Preparedness in Brazil's Construction Sites

In November 2023, faced with a severe heatwave, the SindusCon-SP employers' organisation, the Sintracon-SP São Paulo Construction Industry Workers' Union, and the Seconci-SP construction health organisation launched a campaign including a joint statement, Heatwaves: protect the health of employees on construction sites.

This strongly recommends the adoption of the following measures on construction sites:

- Provide sunscreen, a requirement laid down in collective agreements;
- Check contractors are providing sunscreen;
- Make workers aware of the proper use of sunscreen;
- Hydration is essential! Make drinking water available to employees on a regular and plentiful basis, in compliance with Regulatory Standard (NR) (Brazilian regulation) 18: for every 25 employees, there must be a drinking fountain with fresh, filtered water;
- Make employees aware of the importance of hydrating frequently;
- Provide protection for the back of the neck and ears for workers exposed to the sun;
- Include recommendations on these precautions in Daily Safety Dialogues (DDSs) emphasising that alcoholic drinks do not hydrate, but dehydrate;
- Proper use of PPE and sunscreen;
- If possible, install tents for rest and hydration in the early stages of the work, when there high heat exposure, in the absence of shaded areas;
- Avoid overcrowding in changing rooms and canteens;
- Install mechanical ventilation in canteens;
- Improve ventilation in changing rooms, following the provisions of NR 18;
- Apply clear, reflective paints to the structures in living areas, if possible;
- Adjust working hours, if possible, to avoid exposure to the sun at the hottest times of the day, at the company's discretion, especially between 12pm and 1pm;
- Pay special attention to employees who are more susceptible to the heat - such as those with hyperthyroidism, diabetes, obesity, anxiety - as well as the elderly and pregnant women;
- Consider purchasing new uniforms with lighter fabrics;
- Carry out constant assessments and monitoring of working conditions to identify improvements and adjustments that may be necessary.[41]

40 CNC, CCOO del Hábitat and UGT FICA approve a pioneering protocol for action in the construction sector against high temperatures (fundacionlaboral.org)

41 https://piniweb.com.br/construcao-lanca-campanha-para-enfrentar-o-calor-nas-obras/

National Legislation

Workplace Adaptations for Heat in Belgium

Belgium legislation sets down maximum working temperatures to keep workers safe during extreme heat: 29°C for light physical workload, 26°C for a moderately heavy physical workload, 22°C for heavy physical workload, and 18°C for very heavy physical workload.

Maximum values apply both internally and externally – externally expressed according to the WBGT wet-bulb globe temperature Index (see Appendix) and differentiated by workload.[42]

A Code of Well-being at Work requires employers to carry out "an environmental risk analysis of thermal emissions" in the workplace taking into account:

- air temperature;
- relative humidity;
- air speed;
- thermal radiation;
- physical workload;
- working methods and work equipment;
- the characteristics of work clothing and PPE;
- the combination of all these factors.

Art. V.1-3.- § 2 of the Code indicates the maximum WBGT values at work, depending on the physical workload. This cannot be greater than:

- 29ºC for light or very light work,
- 26ºC for average work,
- 22ºC for heavy work,
- 18ºC for very heavy work.

Chapter IV of the Code details the measures to be taken in the event of exposure to excessive heat, making the distinction between heat of "technological and climatological" origin. Where the reference limits are exceeded, employers must first implement organisational and technical measures to try to reduce and eliminate heat stress at work.

Where the heat arises from the climate, the action values are exceeded, and they continue to be exceeded for 48 hours, the employer must put into place measures including a regime of limited presence at the workstation and planned rest time.

If the WBGT value is equal to or greater than 29.5, there should be 15 minutes of rest per hour. If it is equal to or greater than 30, there should be 30 minutes of rest per hour.

The employer should also distribute free refreshing drinks, in accordance with the opinion of the prevention advisor or occupational doctor, to prevent dehydration.

Title 1 of Book V of the Code emphasises the importance of health surveillance, which is essential when workers are "usually outside".[43]

Cyprus's approach to Work-Rest Balance During High Heat

Cyprus has different maximum values for indoor and outdoor work. For outdoor work these combine air temperature, humidity and workload. Where the reference limits are exceeded, employers must first implement organisational and technical measures to try to reduce and eliminate heat stress at work.

If they cannot achieve this objective, reference tables set out precisely how work and rest times must be alternated, depending on the working environment and workload. In certain conditions, where temperature and humidity are both too high, work activity must be temporarily suspended.

A non-legally binding Code of Practice for heat stress has been published in accordance with the 1996 Work Safety and Health Act. This sets out that:

- In the event of outdoor work, the employer must take adequate measures to avoid excessive exposure to ultraviolet radiation;
- Where there is a possibility that workers are exposed to high heat stress at work, employers

42 Climate crisis requires EU law on maximum working temperatures | ETUC
43 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf

and self-employed workers are required to take technical and necessary organisational measures, through risk assessment, to protect against this;

- In the case of particularly high air temperatures (above 32°C, for example, during heatwaves), there is a precise intervention system.

On the basis of a table combining air temperature, relative humidity and the type of activity being carried out (light, medium and heavy), the employer must take action to guarantee a precise rest time, in the shade, or modify the work.

Air temperature and humidity can be measured either by using precise instruments or by following bulletins and meteorological forecasts.

The table sets out that, for example, where there is an external air temperature of 35°C and a humidity level of 49%, light work can continue. Where there is an average workload, work can continue on the basis of 75% work, and 25% rest or change of work, per hour. In the case of heavy workload, the figures are 50% work and 50% rest (in the shade).

The figures are based on the assumption that the worker is wearing light summer clothes. If a task requires special heavier clothing, exposure to heat must be reduced, depending on the type of clothing and

the work carried out. They also assume the worker has sufficient access to water to avoid dehydration and can work in conditions allowing body temperature to be maintained at below 38°C. The table is not applicable to vulnerable workers such as older and pregnant workers.

The employer is required to keep a daily record of the measures taken to reduce heat stress of workers when applying the table.[44]

Risk Assessment and Preventive Measures in Spain and Brazil

Spain - Royal Decree 4/2023, published in May 2023, made significant changes to the legislative framework concerning working in high temperatures in Spain. It does not introduce a maximum temperature beyond which outdoor work is prohibited. However, it requires specific prevention measures where there is severe heat, triggered when the National Meteorological Agency issues orange or red heatwave alert levels. These are issued when the air temperature is between 37°C and 40°C or between 40°C and 44°C respectively.

The preventative measures are identified through a risk assessment, which must also take into account the characteristics of the work and personal characteristics or health conditions of the worker.

In accordance with article 23 of Royal Decree 1561/1995, which relates to special working days, preventive measures include the prohibition of carrying out certain tasks during particular hours of the day where worker protection cannot be guaranteed in any other way.

If the National Meteorological Agency issues an orange or red alert, and the preventive measures do not guarantee the protection of workers, employers must adapt the working conditions, including by reducing or modifying the hours of the scheduled workday. If the health of workers cannot be effectively protected, there must be a reduction in work activity. The salary of the workers concerned must not be reduced.

Where there is disagreement between the employer and workers or their representatives, there is provision for the Labour and Social Security Inspectorate to intervene.

Brazil - In Brazil, heat exposure for workers must be kept within tolerance limits based on the WBGT index (see Appendix), rest periods, and type of activity.[45]

Setting Safe Work Temperatures in Hungary, Latvia, Montenegro and Slovenia

A 2022 ETUC survey found the following countries had also introduced legislation setting down maximum working temperatures to keep workers safe during extreme heat:

44 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf
45 Workplace Heat Protections Across the Globe (nrdc.org)

- **Hungary**: 31°C for sedentary and light physical work, 29°C for moderately physical work and 27°C for heavy physical work;
- **Latvia**: Maximum working temperature for indoor work of 28°C;
- **Montenegro**: Maximum working temperature for outdoor work of 36°C;
- **Slovenia**: The air temperature in work areas must not exceed 28°C.[46]

Thailand's Heat Standard Regulations: Safeguarding workers with WBGT-Based Limits

Thailand's indoor and outdoor occupational heat standard uses the WBGT (see Appendix) to determine limits for different intensities of physical work: 34°C for light work, 32°C for moderate work (including lifting, towing, pulling or moving anything with medium force), and 30°C for heavy work.[47] Researchers found that workplaces in compliance with the standard had the lowest proportion of workers at risk of heat stress.[48]

Philippines Recommended Exposure limit values for work in hot environment expressed as WBGT

In the Implementing Rules and Regulations of Chapter 7 of the Code on Sanitation of the Philippines on Industrial Hygiene of the Sanitation Code of the Philippines Amending Administrative Order No. 111 S. 1991 there is recommendations exposure limit values and adjustements for workschedules for work in hot environment expressed as WBGT (see Appendix).

Work/Rest Regimen	Workload		
	Light	Medium	Heavy
Continuous work	30.0	26.7	25.0
75% work – 25% rest /hour	30.6	28.0	25.9
50% work – 50% rest /hour	31.4	29.4	27.9
25% work – 25% rest /hour	32.2	31.1	30.0

Health Surveillance for Heat Stress in Costa Rica

Established in 2015, Costa Rica's Regulation for Prevention and Protection of Workers Exposed to Heat Stress aims to protect outdoor workers from heat stress. It was introduced after numerous studies highlighted the prevalence of chronic kidney disease among farmworkers in Central America. Based on the US Occupational Safety and Health Administration's Water, Rest, Shade campaign, employers must provide workers with protective measures including training, personal protective equipment, time to acclimatise to the heat, rehydrating drinks, and shaded areas for rest. Workers must also be enrolled in a health surveillance programme focused on kidney health and function.[49]

Certification and Acclimatisation Measures in South Africa

In South Africa, there is no absolute maximum temperature beyond which work must stop. However, the 1987 Workplaces Regulations provide that where workplace temperature rises above 30°C WBGT (see Appendix), the employer must try to reduce the temperature. If they cannot reduce the temperature, they must put in place specific prevention measures if heavy manual work is carried out. These include:

- ensuring each employee is certified as fit to work in such an environment by an approved physician;
- ensuring everyone is acclimatised to this work environment before they are required or permitted to work in such an environment;
- informing each employee of the need to drink at least 600 ml of water per hour;
- training employees on precautions to take to avoid heat injuries; and
- providing the means by which each employee can quickly receive first aid for heat stroke.[50]

46 Climate crisis requires EU law on maximum working temperatures | ETUC
47 The dangers of working in extreme temperatures | IOSH Magazine
48 Workplace Heat Protections Across the Globe (nrdc.org)
49 Workplace Heat Protections Across the Globe (nrdc.org)
50 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf

Guidelines for Outdoor Work Under Heat in South Korea

Although South Korea does not set a maximum temperature in workplaces, or a maximum duration exposure to a specific temperature, a guide on preventing heatstroke sets out three basic rules. This recommends the following for outdoor work:

- **Alert**: 31°C or higher: Provide water, shade, and rest and identify heat illness sensitive groups in advance;
- **Caution**: 33°C or higher: Take breaks in the shade for 10 minutes every hour, shorten outdoor work (or adjust work hours) during peak heat hours (2pm to 5pm);
- **Warning**: 35°C or higher: Take breaks in the shade for 15 minutes every hour, suspend outdoor work during peak heat hours (except when unavoidable); and
- **Danger**: 38°C or higher: Take breaks in the shade for 15 minutes every hour, suspend outdoor work during peak heat hours (except in case of emergency such as disasters).

State, provisional and territorial legislation

Heat Safety Legislations: Advanced Measures in California, Oregon and Washington States

There is no specific legislation regarding high temperatures at work at central government level in the United States (US) at present. The Biden administration says it remains committed to a federal heat standard to ensure protections in workplaces across the country, but this remains several years away.[51]

Two bills were introduced in the US Congress in 2021: H.R. 2193 (at the United States House of Representatives) and S. 1068 (in the Senate) entitled Asuncion Valdivia Heat Illness and Fatality Prevention Act of 2021. Asuncion Valdivia was a California farm worker who died of heat stroke in 2004 after working for 10 hours without a break at a temperature of 105°F (40.5°C).

If passed into law, these bills would require the OSHA occupational safety and health regulatory body to propose, within two years, and then develop within 42 months, a binding standard relating to exposure to heat in both indoor and outdoor workplaces. They would establish measures such as paid break periods in cool spaces, provision of water, limiting time of exposure to heat and emergency response for workers suffering from heat-related illness. Employers would have to train their employees on heat-related risks

and illnesses and on procedures to follow in case of symptoms.[52]

Several states have also passed laws regulating workers' exposure to extreme heat: Minnesota, California, Washington and Oregon. In Minnesota the measures adopted only concern indoor work premises.

Oregon introduced heat stress provisions into its law in 2022, after experiencing a deadly heatwave with peaks of 46.6°C the previous year. The measures introduced in California, Oregon and Washington are similar. California and Washington have specific regulations for outdoor workplaces, while in Oregon the regulations concern both internal and external locations.

In all three states, the law does not provide a precise maximum temperature beyond which work must stop. Instead, above certain heat thresholds, employers must implement specific preventive measures regarding:

- access to drinking water;
- access to shaded spaces;
- acclimatisation;
- emergency response planning and specific measures in the event of a heat wave; and
- training employees and supervisors.

They must also develop a Heat Illness Prevention Plan (HIPP), detailing how they will guarantee compliance with the heat prevention provisions.

California - The California Code of Regulations, Title 8, Section 3395 contains obligations for employers in five sectors including construction and landscaping.

To prevent heat-related illnesses, employers must:

- Provide employees with free, fresh and pure drinking water located as close as possible to the areas where employees work;

51 The dangers of working in extreme temperatures | IOSH Magazine
52 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf

- When the outside temperature in the work area exceeds 80°F (26.6°C), establish and maintain one or more shaded spaces at all times while employees are present;
- Follow specific procedures in case of high temperature. If the temperature is equal to or greater than 95°F (35°C) the employer must ensure:
  - effective communication so employees can contact a supervisor if necessary and observe employees to check their alertness and signs or symptoms of discomfort due to the heat.
  - effective observation or monitoring of employees by implementing one or more of the following measures:
    a) designate a supervisor to observe a maximum of 20 employees, or
    b) set up a buddy system (work at least in pairs, never alone), or
    c) if the employee is alone, communicate regularly with them, for example by radio or cell phone, or
    d) use other effective means of observation.
  - designate one or more employees on each job site as authorised to call emergency medical services and allow other employees to call for emergency services when no designated employee is available.
  - remind employees to drink plenty of water throughout the day.
  - hold meetings before work begins to review procedures in case of high heat, encourage employees to drink plenty of water, and remind employees of their right to rest if necessary.
- Follow specific procedures in the event of an emergency response: for example, if an employee shows signs or symptoms of heat illness, they should be monitored and not be left alone or sent home without being offered first aid on site and/or receive emergency medical services in accordance with the employer's procedures.
- Follow special measures in the event of "heat waves", in particular:
  - All employees must be closely supervised by a supervisor or designated person during a "heat wave", which refers to any day during which the maximum expected temperature will be at least 80°F (26.6°C) and at least 10°F higher than the average daily high temperature of the previous five days.
  - An employee newly assigned to a high heat area must be closely monitored by a supervisor or a designated person during the first 14 days of their job.
- Provide heat exposure training for employees and supervisors, in particular:
  - environmental and personal risk factors for diseases caused by heat, and the additional impact of heat stress on the body caused by effort, clothing and personal protective equipment;
  - the employer's procedures for complying with the requirements of the regulations;
  - the importance of frequent water consumption;
  - the importance and methods of acclimatisation;
  - the different types of heat illness, signs and symptoms, appropriate first aid and/or emergency response;
  - how to report to the employer symptoms or signs of heat illness on oneself or a colleague.
- Supervisor training should address procedures to follow if an employee exhibits signs or symptoms related to heat, monitoring weather forecasts and reaction to heatwave warnings.

Finally, the employer must put in place a HIPP (see page 23). This must be written in English and in the language understood by the majority of employees and be made available to employees in the workplace upon request.[53]

53 California Code of Regulations, Title 8, Section 3395. Heat Illness Prevention in Outdoor Places of Employment.

Health warning! Florida and Texas

Shockingly, in March 2024, Florida's state Senate passed new legislation that would ban local governments in Florida from mandating heat exposure protections for workers. The bill is "now on the desk" of the Republican Governor, Ron DeSantis, who will need to sign it within a year for it to become law. House Bill 433 prohibits localities in Florida from mandating protections such as providing workers with water, rest and shade. Should DeSantis sign it, from 1 July 2024, counties and cities in Florida will not be able to require employers to have any type of mitigations to extreme heat, even for outdoor workers in construction and agriculture.[54]

The move follows legislation enacted in Texas in 2023 which means employers cannot be required to provide workers with outdoor water breaks or time in the shade to avoid potential heat-related illnesses. Forty-two workers died in Texas from heat exposure between 2011 and 2021, the highest number in the US, the Texas Tribune reported.[55]

Adaptive Heat Safety Standards Across Canadian Provinces and Territories

In Canada, at central government level there is no specific legislation regarding high temperatures at work, with the exception of limits expressed according to the Humidex Index (see Appendix) for indoor civil service work.

However, several Federal Provinces and Territories have adopted more specific measures regarding heat stress. British Columbia, Manitoba, Newfoundland and Labrador, New Brunswick, Nova Scotia, Prince Edward Island – as well as the Northwest Territories and Nunavut for work in mines – have made it obligatory to respect "maximum values of thermal constraints" as described by the American Conference of Governmental Industrial Hygienists (ACGIH).

These constraints refer to the WBGT Index (expressed in °C) (see Appendix). They take into account workload and distinguish between acclimatised and non-acclimatised workers. A reference table sets out a precise alternation between work and rest times when certain WBGT levels combined with the workload are reached.

During rest time it is possible to assign the worker other (lighter) tasks, paying particular attention to activities associated with high levels of fatigue which prevent the body from cooling down properly.

Quebec has its own table with values of the WBGT Index expressed in °C and combined with workload. This also suggests an alternation between work and rest times when certain WBGT levels are reached.

Legislative work is underway to modify the Canadian law with a view to introducing obligations relating to heat stress in the Canadian Occupational Health and Safety Regulations (COHSR).[56]

Recommendations and Guidelines from National Regulators and Other Institutions

France's Heatwave Management: Guidelines and Employer Responsibilities

Ministry of Labour instructions for employers in the event of a heatwave alert advise that when Météo France publishes a red alert for the risk of heatwave, employers must carry out a daily risk reassessment for each employee based on temperature and its development during the day, the nature of the work to be carried out, particularly where there are already high temperatures, or the work involves physical load, and the age and state of health of workers.

Based on this assessment they must:

- Adjust workloads, schedules and more generally the organisation of work to guarantee the health and safety of workers throughout the duration of the red alert period. Particular attention should be paid to pregnant women and people suffering from chronic health conditions or disabilities;
- Decide to stop the work if the evaluation shows the measures taken are insufficient, particularly for work carried out at very high temperatures and involving a significant physical load, such as roof or roof insulation work or repeated handling of heavy loads.

The interministerial guide *Specific provision: Health management heat waves*, published in 2021 and 2022 and regularly updated, sets out that employers must:

- ensure the development and updating of the single risk assessment document and an internal heat wave management plan if applicable;
- designate someone responsible for preparation and management of the plan;
- identify the workstations most exposed to a significant heat source;
- inform employees of the risks, means of prevention, and the signs and symptoms of heat stroke;
- regularly consult weather forecasts in order to anticipate as much as possible and rearrange the

54 https://www.constructiondive.com/news/florida-ban-water-break-mandate-heat/710313/
55 https://www.constructiondive.com/news/texas-water-break-mandates-impact-construction-workers-Greg-Abbott/653677/
56 https://nationalmagazine.ca/en-ca/articles/law/hot-topics-in-law/2023/heat-stress

activity, particularly if it must take place outdoors and involves physical effort;

- put in place organisational and appropriate measures such as staggered hours or more frequent breaks.[57]

Work Suspension Policies During Extreme Heat in Greece and Spain

Greece - Labour Inspectorate guidance published in June 2022, Prevention of heat stress among workers, advises employers to:

- reduce or cease work activity in areas particularly exposed to heat such as shipbuilding and asphalt laying between 12pm and 4pm;
- provide canteens or other appropriate spaces for breaks, equipped with air conditioning systems;
- provide fresh drinking water at a temperature of 10-15°C.

Photo: WRSMH

The Ministry of Labour has also set up a technical working group including representatives of the social partners and scientific experts, to develop a framework to protect workers against heat stress using the WBGT Index (see Appendix).

Spain - Labour Inspectorate and Ministry of Labour advice includes the following preventative measures:

- provide drinking water near workplaces;
- plan the heaviest and most difficult tasks during cooler hours by adapting working hours; take more breaks than usual in cool places;
- try to use loose clothing, light fabrics and light colours. Protect the head with a cap or hat;
- set up shaded areas or cool places so that workers can rest;
- avoid isolated work and favour teamwork to facilitate recognition of the first symptoms of heat stroke;
- inform workers about the risks linked to heat, its effects and prevention measures and first aid to adopt.[58]

Italy's Integrated Response to Heat Stress at the Workplace

Recommendations from the INAIL AT/MP insurer, in collaboration with the CNR-Ibe national research council-institute of bioeconomy include:

- facilitating the acclimatisation of workers to working conditions and exposure to heat. This must be progressive, particularly for new workers; and
- emergency planning and response.

Humidity and Heat: Occupational Assessments in Malta

The OSHA Occupational Health and Safety Authority in Malta recommends the use of the WBGT Index to assess heat stress at work. Its guidance guide highlights the importance of knowing the humidity level at work, in order to properly understand the measures to put in place to prevent accidents. It also emphasises that "danger money" or financial compensation given to staff working in a dangerous environment is unacceptable: "we cannot pay workers to work in the sun instead of taking the necessary measures".[59]

Swiss Safety Specialist Assessments for Heat Stress

Advice from SUVA insurance, one of the country's main accident insurers, includes using a recognised occupational safety specialist to assess the work situation when the air temperature reaches 36°C.[60]

Heat Stress Risk Assessments in the UK

Guidance from the HSE health and safety regulator includes a detailed heat stress checklist to be used when conducting a heat stress risk assessment.[61]

57 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf
58 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf
59 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf
60 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf
61 https://www.hse.gov.uk/temperature/assets/docs/heat-stress-checklist.pdf

Monitoring Solar UV Radiation for Worker Safety in Australia

The Safe Work Australia government agency has published a guide on exposure to solar ultraviolet radiation (UVR). Workplace Health and Safety Queensland has developed a basic heat stress calculator to facilitate the assessment of work-related heat risks.[62]

Health Checks and Heat Stress in New Zealand

WorkSafe New Zealand, the OSH regulator, provides screening questionnaires for employees. These highlight the importance of health checks prior to carrying out a specific task, including during certain extreme thermal conditions: "this is particularly important for detecting any temporary conditions that may not have been mentioned during pre-employment interviews". The questionnaires should only be completed with the help of a doctor or nurse specialising in occupational health.[63]

South Africa's Collaborative Approach to Heat Health Action Guidelines

National Department of Health 2020 National Heat Health Action Guidelines state that "government, businesses and unions must work together to develop regulatory frameworks and labour standards specifically relating to heat-related risks in the workplace".

They highlight potential intervention measures against heat stress, including:

- adjusting working hours to start earlier in the day;
- the possibility of workers choosing flexible working hours;
- modification of the dress code;
- the rotation of workers who alternate between hot zones and cool zones;
- frequent break times;
- monitoring workplace temperatures and frequent risk assessments.

Outdoor workers must be guaranteed increased protection against direct sunlight, for example, by creating shaded outdoor areas, having a fresh water source nearby, encouraging workers to drink before they become thirsty, and ensuring that sufficient breaks are taken in cool or shaded areas. They should wear light, loose, light-coloured clothing that protects against sun while allowing air to circulate and protect their heads with a hat.[64]

Heat Illness Prevention Plans: a US Strategy

The NIOSH study, Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments provides a detailed overview of the risks linked to working in the heat and the factors that influence heat stress, and gives recommendations on maximum heat values at work as well as general prevention recommendations.[65]

The OSHA Occupational Safety and Health Administration regulator also provides detailed guidance including the following:

Creation of a Heat Illness Prevention Plan

Employers should create a written plan to prevent heat-related illness considering the following important elements:

- Who will provide oversight on a daily basis?
- How will new workers gradually develop heat tolerance?
- Temporary workers may be more susceptible to heat and require closer supervision.
- Workers returning from extended leave (typically defined as more than two weeks) may also be at increased risk.
- How will the employer ensure that first aid is adequate and the protocol for summoning medical assistance in situations beyond first-aid is effective?
- What engineering controls and work practices will be used to reduce heat stress?
- How will heat stress be measured?
- How to respond when the National Weather Service issues a heat advisory or heat warning
- How to determine if the total heat stress is hazardous
- What training will be provided to workers and supervisors?

Day-to-Day Supervision

Heat conditions can change rapidly and management commitment to adjusting heat stress controls is critical to prevent heat illness. An individual at the worksite should be responsible for monitoring conditions and implementing the employer's heat plan throughout the workday. This individual can be a foreman, jobsite supervisor, plant manager, safety director, or anyone else with the proper training. This includes knowing how to:

62 More information | WorkSafe.qld.gov.au
63 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf
64 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf
65 Occupational Exposure to Heat and Hot Environments | NIOSH | CDC

- identify and control heat hazards;
- recognise early symptoms of heat stress;
- administer first aid for heat-related illnesses; and
- activate emergency medical services quickly when needed.

Ideally, the individual who is responsible for the heat plan should be on-site. On-site monitoring allows accurate determination of heat stress.[66]

Photo: cdn.vox

Work Practices

Where worksites cannot be cooled by engineering controls, employers should modify work practices. They should consider the following:

- Modify work schedules and activities for workers who are new to warm environments.
- Schedule shorter shifts for newly hired workers and unacclimatised existing workers. Gradually increase shift length over the first 1-2 weeks.
- Require mandatory rest breaks in a cooler environment (such as a shady location or an air-conditioned building). The duration of the rest breaks should increase as heat stress rises.
- Consider scheduling work at a cooler time of day, such as early morning or late afternoon.
- Reduce physical demands as much as possible by planning the work to minimise manual effort (such as delivering material at the point of use so manual handling is minimised).
- Rotate job functions among workers to help minimise exertion and heat exposure.
- Ensure workers drink an adequate amount of water or electrolyte-containing fluids.
- Employers should have an emergency plan that specifies what to do if a worker has signs of heat-related illness and ensure that medical services are available if needed.
- Workers should watch out for each other for symptoms of heat-related illness and be prepared to administer appropriate first aid to anyone who is developing a heat-related illness.
- In some situations, employers may need to conduct physiological monitoring of workers.
- Implement a buddy system for new workers and in heat stress environments.
- Avoid drinking hot beverages during lunch and afternoon breaks.

Personal Protective Equipment

In most cases, heat stress should be reduced by engineering controls or work practice modifications. However, in some limited situations, special cooling devices can protect workers in hot environments.

These include:

- Insulated suits
- Reflective clothing
- Infrared reflecting face shields
- Cooling neck wraps

In extremely hot conditions, the following thermally conditioned clothing might be used:

- Vest that receives cooled air from a vortex tube connected to an external compressed air source.
- Jackets or vests with reusable ice packs or phase change cooling packs in the pockets.

Workers should be aware that use of certain personal protective equipment (e.g., certain types of respirators, impermeable clothing, and head coverings) can increase the risk of heat-related illness.[67]

EU-OSHA's Heat Guidelines for Worker Safety

The EU-OSHA European Agency for Safety and Health at Work developed guidelines on heat stress following ETUC pressure on the European Commission to act after workers collapsed and died while working during heatwaves in recent summers.[68]

Its Heat at Work guidelines set out employers' obligations to workers, including:

- Carrying out a workplace risk assessment and protecting vulnerable workers;
- Consulting workers and their representatives about how to manage heat risks;

66 Heat - Planning and Supervision | Occupational Safety and Health Administration (osha.gov)
67 Heat - Engineering Controls, Work Practices, and Personal Protective Equipment | Occupational Safety and Health Administration (osha.gov)
68 https://www.etuc.org/en/pressrelease/schmit-tells-bosses-protect-workers-extreme-heat

- Adapting working hours and allowing workers to decide when to take breaks;
- Ensuring workers have a supply of drinking water, access to a shaded area and protective clothing; and
- Providing training on how to manage heat stress for at-risk workers.

The guide is based on information from the US National Institute for Occupational Safety and Health (NIOSH), the UK Health and Safety executive (HSE), the Canadian Centre for Occupational Safety and Health (CCOSH), and Safe Work Australia.[69]

Other advice

Heatstroke Prevention with Heatstroke Bracelets in France

The OPPBTP French agency specialising in risk prevention in construction and civil engineering has published recommendations on dealing with extreme heat on construction sites, *High Heat and Heat Waves on Construction Sites - Recommendations Guide.*[70]

"It is no longer enough to manage the crisis during strong heat, it must be anticipated with the involvement of construction stakeholders," it says. "Anticipating means considering, for example, agreements with your customers on the arrangement of working hours, places of rest adapted for recovery of employees."

It estimates acclimatisation time between 8 and 12 days. Above 28°C, efforts linked to physical activity should be avoided and strongly recommends measures including the organisation of work during lower temperatures, in the shade if possible.

During periods of extreme heat, the risk of explosion or fire is greater important, it says. Precautions are necessary to avoid the formation of explosive atmospheres linked to the use of chemicals containing flammable materials or explosive gases.

It also advocates using equipment to warn of heat stroke: a "heatstroke bracelet" protects workers by sounding the alarm when the body heats up.

69 Schmit tells bosses: Protect workers from extreme heat | ETUC
70 https://www.preventionbtp.fr/ressources/documentation/ouvrage/fortes-chaleurs-et-effets-caniculaires-sur-les-chantiers-guide-de-preconisations_NLKhnmb2rzoPBArtyvRn2U

4. Workers' Compensation Measures for Work Interruptions Due to Extreme Heat

Unions are clear that workers should not pay the price for climate change. Several countries already have provisions allowing workers to stop work for a period of time on days affected by exceptional heatwaves and receive wage compensation or unemployment benefits during this period. In some cases, previous provisions for work in bad winter weather have been extended to cover heatwaves. The situation in Austria, France, Germany, Italy and Luxembourg are examined below.

Austria's Union-Driven Progress in Heat-Induced Work Stoppage Compensation

A 1957 law in Austria, the Construction Workers' Bad Weather Compensation Act (BschEG), provides compensation for construction workers. After a long struggle by the Gewerkschaft Bau-Holz (GBH) union of construction and wood workers, the definition of bad weather (in article 3) was amended in 2013 to include heat.

Previously, bad weather unemployment could be claimed when the air temperature reached 35°C, but in 2019 the threshold was reduced to 32.5°C following GBH campaigning. The union is now campaigning for the threshold to be reduced to 30°C.

The current definition of "heat" is temperatures during the summer period (1 May – 31 October) of more than 32.5ºC in the shade, according to official measurement data from the Central Institute for Meteorology at the nearest measuring station (see Heat App below).

If this temperature is exceeded for at least three hours per day, the employer may order work to be stopped. Employees must perform other suitable work if this is possible. However, this is often not possible at a construction site.

These temperature thresholds are not set out in law, but in the Austrian construction industry collective agreement. If no other work is possible, the employer pays 60% of the gross salary which would have been paid without the interruption of work as bad weather compensation. The wage costs incurred are reimbursed by the Construction Workers' Leave and Severance Pay Fund. A quota of 120 hours per employee is available to each employer during the six-month summer period. This is equivalent to 15 working days for full-time employees. The system is financed via a monthly compensation contribution amounting to 1.4% of the gross wage, which is borne equally by the employer and the employee. Only construction workers benefit from this regulation. Gardeners, forestry workers and road maintenance workers, for example, are not covered.[71]

According to the GBH, in 2019 "one in two companies [in the sectors concerned] used this mechanism. As a result, 39,122 construction workers from 5,245 companies were able to escape from the heat".

However, the decision to stop work lies with the employer – there is no legal right to time off. In 2020, the GBH, AK (Chamber of Salzburg) and the Austrian Trade Union Confederation Österreichischer Gewerkschaftsbund (ÖGB) reported that too few employers were using this mechanism even in the presence of high temperatures.

The GBH called for a new regulation to require all companies in the transport and construction sectors to stop work when the temperature exceeds 32.5°C. It is also demanding that the law provides for the possibility of extending construction deadlines due to heatwaves, so businesses do not incur penalties for stopping work (see Provision for heat delay in construction contracts).[72]

The Austrian Heat App

In 2021, GBH, AK and the Global 2000 Austrian environmental organisation launched Heat.App for workers in the construction sector. The BSchEG law (see above) refers to temperature levels taken at the nearest measuring point to the ZMAG central mete-

71 Work during heat waves and other forms of bad weather: what should Austrian employers be aware of? - Lexology
72 GBH - Alliance "Protecting people and the climate instead of profits" presents labour law plan for heat-free from 30 degrees (bau-holz.at)

orological and geodynamics institute. However, only employers had access to these. The app gives workers access to real-time information from the nearest ZAMG measurement point via their mobile phone. A warning signal is sent to the app as soon as 32.5°C is reached.[73]

France's Inclement Weather Leave Fund: Adapting to Extreme Heat

Employers working in the construction industry are required to affiliate their company to a "*Congés Intempéries*" BTP fund (poor weather conditions leave). There is an employee compensation scheme in the event of interrupted work caused by bad weather making work dangerous.

To benefit from it, the employee must have worked for 200 hours during the previous two months and be present on the site when the activity stops, unless there is a justified reason for the absence. The employer can ask the employee to carry out replacement work to avoid having to use this fund.[74]

The draft law aimed at adapting the labour code to the consequences of global warming, presented in the French national assembly in July 2023, points out that heatwaves can no longer qualify as exceptional climatic hazards and therefore "the prospect of compensation by the State for all hours not worked due to excessively high or insufficient temperatures cannot be considered satisfactory".

It goes on to add that the construction industry regional bad weather funds (articles L. 5424-8 et seq. of the Labour Code) are supplemented by bad weather unemployment contributions paid by companies. The climatic conditions giving entitlement to compensation for hours of work not worked were specified by ministerial letters in 1947, but these do not include heatwaves and are "retained on a case-by-case basis". This situation needs to be "fixed", it makes clear.[75]

Germany's Roofing Collective Bargaining Agreement: Safeguarding Workers from Heat Impacts

The German collective bargaining agreement for construction industry stipulates that during the period from April to November, roofers receive compensation for up to 53 hours if they are unable to work due to a weather-related reason, high temperatures for example. The compensation is 75% of the renumeration the worker would have received if they had worked during that time. The system is financed by all employers in the sector paying a contribution to the SOKA DACH union pension fund.[76]

73 Christian Fölzer, International Economic and Political Advisor, Bau-Holz Trade Union
74 FBA - French Business Advice - The specificities of the building and public works sector in regard to social law
75 Bill n°1587 - 16th legislature - National Assembly (assemblee-nationale.fr)
76 Building and Wood Workers International regional affiliate

Italy's Unemployment Scheme Protection in High Temperatures

The unemployment scheme *Cassa Integrazione* can be invoked by the employer in the event of suspension or reduction in work due to high temperatures exceeding 35°C. The IPNS national institute of social protection can also accept a request for support from an employer where the temperature is below 35°C, but the "felt temperature" is higher than the air temperature – where there is high humidity, for example. The type of work and the way it is done is also taken into consideration. Workers likely to experience a "felt" temperature higher than the air temperature include road surfacing workers, those working on facades and roofs of buildings, and those carrying out exterior work requiring protective clothing.

Where an employee is laid off due to bad weather, they generally receive a contribution equal to 80% of overall salary (subject to annual ceilings set by the INPS).[77]

Luxembourg's Unemployment Benefits for Heat-Induced Work Interruptions

In Luxembourg, labour law provides an unemployment benefit system for bad weather in the construction sector. In the event of exceptional heat, the employment minister can provide access to the system for workers whose work has become dangerous as a result of high temperatures.

Following a successful application by the employer, the state reimburses the company 80% of the salaries normally received by employees from the date of the 17th hour of monthly unemployment. The compensation must not exceed a limit of 250% of the minimum wage.

The employer can choose to use the system but must consult worker representatives before suspending work. The mechanism has been very rarely used in cases of extreme temperatures and no request was made in 2020 or 2021, although it is likely that construction companies would have used it in 2022 during the second hottest summer on record in the country.[78]

77 Building and Wood Workers International regional affiliate
78 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf

5. Implementing Heat Delay Clauses in Construction Contracts

The BWI is calling on clients to build in "heat delay" clauses in construction contracts so that contractors are not penalised when work overruns as a result of stopping work to protect workers from extreme heat. At present, standard contracts do not generally make provision for extending periods of construction work in the event of extreme temperature. However, as set out below, there is provision in South Korea's Occupational Safety and Health Act, and in various contract rules and standards, for work to be extended without the contractor incurring a financial penalty.

Adaptive Contracting: South Korea's Provisions for Heat Delay in Construction

- ***Occupational Safety and Health Act***

The South Korean Occupational Safety and Health Act allows for the extension of the period of construction work in the event of extreme temperatures and humidity in summer.

Under Article 70 "the project owner must grant an extension of the period of construction (unless there is a compelling reason not to do so), if the construction project is delayed for one of the following reasons and the contractor requests this extension in order to prevent workplace accidents:

- In the event of force majeure, including bad weather such as typhoons and floods, wars, serious incidents, earthquakes, fires, epidemics, riots or any other extenuating circumstance independent of the will of the contracting parties; or
- When the start of construction is delayed or construction is interrupted for reasons attributable to the project owner.

High temperatures can fit into the concept of bad weather or circumstances beyond the control of the employer.[79]

- ***Established Rules of Contract (Ministry of Strategy and Finance)***

If the work is deemed significantly difficult due to the heatwave, the ordering authority may suspend the construction, extend the contract period for the suspended period, and adjust the contract amount.

No delay damages shall be imposed on the contractor if construction work cannot be performed for a certain period of time because of significant difficulties due to a heatwave.[80]

- ***Standard Contract for Private Construction Works (Ministry of Land, Infrastructure, and Transport)***

The subcontractor may request the contractor extends the construction period if the construction is delayed due to heatwaves, and the contractor shall immediately take measures such as extending the contract period and adjusting the contract amount, and shall not charge a delay fee for the extension period.[81]

- ***Local Government Bidding and Contract Execution Standards (Ministry of the Interior and Safety)***

This includes provision for suspending the construction work due to a heatwave, or extending the construction period if the contractor requests a reduction in working hours.

It is possible to issue orders for contractors to work on holidays or at night if necessary to avoid peak heat or to adjust the contract amount when the contract period is suspended or extended, or working hours are changed.[82]

79 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf
80 Established Rules of Contract Article 23 (Adjustment of contract amount due to changes in other contract details), Article 25 (Delay damages) and Article 26 (Extension of contract period), and (General Conditions for Construction Contracts) Article 47 (Suspension of construction)
81 Article 17 (Extension of Construction Period) of the Standard Contract for Private Construction Works.
82 Established Rules Chapter 13, Article 5, Paragraph 6 (Holiday and Night Work); Chapter 13, Article 7, Paragraph 4 (Adjustment of Contract Amount Due to Other Changes in Contract Details); Chapter 13, Article 8 (Delays in Contract Performance, and Cancellation and Termination of Contract).

6. Advanced Planning Tools for Managing Heat Risks in Construction

By incorporating weather forecasting into their strategies, construction companies can be more proactive against temperature risks.[83]

Utilising Meteorological Data for Work Planning in Greece

The website of the EMY Greek meteorological service has a geographical map of Greece with different colours depending on the WBGT values of the day. For each colour, the site makes the following recommendations:

- **White**: work activity can continue normally.
- **Green**: moderation regarding the execution of heavy work by non-acclimatised workers, frequent water consumption (every hour).
- **Yellow**: reduce heavy work for any non-acclimatised personnel, avoid working in unshaded areas, pay attention to rest periods, and consume water regularly (every 30 minutes).
- **Red**: avoid working in direct sunlight, take long periods of rest, and consume water every 15 minutes.
- **Black**: stop all exterior work in areas without shade.

It references the Famelab website which includes a tool which, by combining the air temperature and humidity, estimates heat stress using a simplified WBGT value.[84] [85]

Predicting Heat Stress: Italy's Worklimate Project for Safe Construction

The INAIL insurer and CNR national research council are collaborating on a Worklimate project using INAIL data and accident statistics. They have developed a heat stress prediction system using the WBGT Index (see Appendix). The platform attempts to predict the risk of heat stress in spring and summer in Italy.

The predictions are based on a standard worker (175cm tall and 75kg weight) who is not acclimatised to the heat and carries out a moderate to intense activity in direct sunlight or shade. They are not wearing PPE or clothing that increases the risk.

The software develops geographic maps of Italy showing forecasts of heat risk over a maximum of three days, at four times of the day: 8am, 12pm, 4pm and 8pm.

- If the predicted WBGT value is less than 80% of the personal WBGT threshold (of the standard worker), the resulting risk will be zero (green);
- If the predicted WBGT value is between 80 and 100%, the risk will be low (yellow);
- If the predicted WBGT value is greater than the personal threshold, the risk may be moderate (between 100 and 120%, orange) or high (greater than 120%, red).

Worklimate is also developing a mobile app to obtain forecasts of personalised risk of thermal stress, according to the characteristics of each worker (size, weight, physical activity practiced, type of clothing worn) and the work environment (exposed to the sun or in shaded areas).[86]

83 (24) Navigating the Heatwaves: How the Construction Industry Can Adapt to Australia's Rising Temperatures | LinkedIn
84 https://eurogip.fr/wp-content/uploads/2023/06/EUROGIP-Travail-par-forte-chaleur-et-canicule-loi-et-prevention-a-l-international.pdf
85 https://www.famelab.gr/el/ergasia/
86 https://www.worklimate.it/wp-content/uploads/2024/03/Approfondimento-eng-v10.pdf

7. Strategic Recommendations and Conclusions for Managing Workplace Heat

Over recent years, we have witnessed increases in global warming. Rising temperatures impact workplaces and expose workers, particularly those performing physically demanding tasks and working outdoors in direct sunlight, to acute mental and physical health risks from heat stress. In response, some governments and industry social partners have begun to address the challenges of working in excessive temperatures by introducing a range of legislative and regulatory measures, often initiated through established collective bargaining arrangements.

Measures to build workplace resilience focusing on immediate impacts or near-term risks are slowly taking root across the construction sector but, as this research highlights, there is still much work to do. Trade unions are key actors in protecting and promoting the interests of workers in a world of work increasingly impacted by rising temperatures.

As unions, employers and governments respond to climatic events impacting the world of work, the need for worker "voice", advocacy, and representation to underpin developments and collective bargaining cannot be understated.

Trade unions are negotiating changes to working arrangements and various adaptation solutions that help build resilience to climate risks at the workplace while supporting workers facing increased climate-related health risks. The role, rights and functions of trade union health and safety representatives are of paramount importance in negotiating timely climate responses, policies, and adaptations, and informing risk assessments and changes to the organisation of work in extreme temperature conditions.

An increasing focus on employer obligations and responsibilities to manage heat-related hazards and risks at work emerges from the numerous and proactive interventions reported in this study. Inadequate heat management by employers not only poses severe health risks to workers but also results in corporate losses and significant employers' liabilities. Increasing bottom-line risks and liabilities for employers include:

- **Human rights risks**: A lack of due diligence and non-compliance with heat safety regulations can lead to severe human rights violations, including worker sickness and even deaths, which attract legal consequences and damage to corporate reputation.
- **Productivity losses**: Heat-induced productivity loss is a direct threat to project timelines and profitability, with the potential to incur billions in financial losses due to reduced working hours, workforce absence and increased costs related to alternative staff cover, and reduced efficiency.
- **Liabilities**: Employers face increasing legal and financial risks if they fail to implement adequate heat safety measures. This includes potential lawsuits, increased insurance premiums, compensation and remedy claims, and regulatory fines and penalties.

Existing regulations and practices in the industry often rely on**:**

- **Project planning** and delivery deadlines designed to accommodate inclement weather occurrences re-organising working schedules or the degree of heavy manual work being conducted for example) in the procurement process, and
- **State-provided social protection** measures that cover workers' income in periods of work stoppage.

Towards Safer Workplaces on a Warming Planet: Strategic Responses to Heat Hazards in Construction

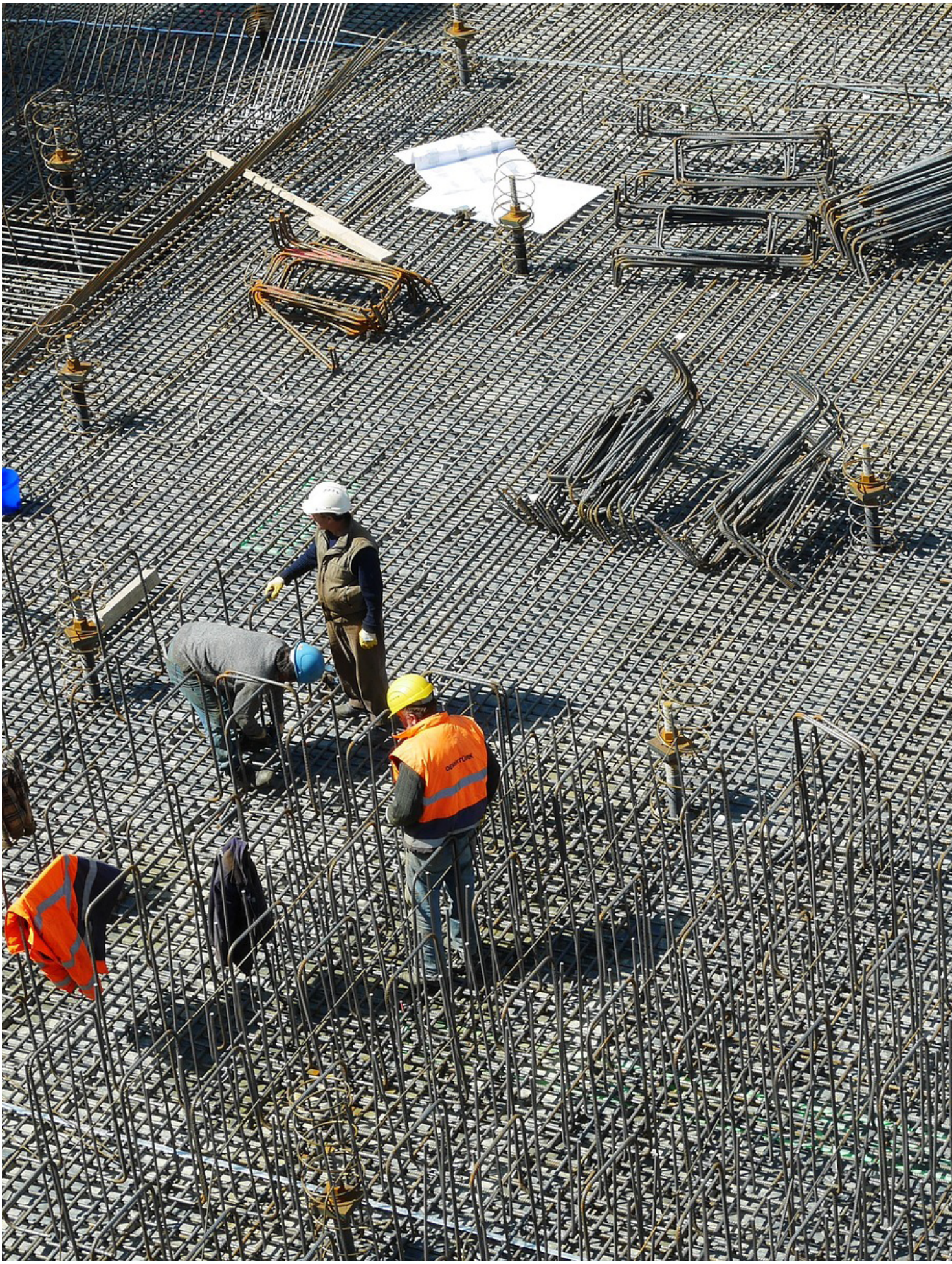
This report advocates for a blend of legislative action, strategic collective bargaining, and proactive employer initiatives to safeguard worker health and improve industry standards. Considering the use of extensive sub-contracting procedures across construction – and the often localised impact of climatic events, it is essential that trade unions and employers are "enabled" to respond to extreme weather situations, utilising mature social dialogue arrangements, to agree the introduction of various adaptation measures to alter working arrangements and protect workers health and wellbeing at the workplace.

There is also an economic case for joint trade union and employers' advocacy and negotiations on heat stress management. It can help industry employers and companies increase and maintain productivity levels, achieve a positive return on investment, and mitigate liabilities for companies as well as reduce harm and improve workforce health.

It is also imperative that governments across the globe proactively "scale-up" preventative and protective measures and universal occupational safety and health legislation to enhance sustainable benefits, resilience, and the protection of workers working in extreme temperatures.

Based on existing practices, the outlined recommendations below provide a framework for adapting to climate challenges related to heat-induced hazards, ensuring workplace and industry resilience and sustainability through Collective Bargaining Agreement provisions, regulations, and enforcement mechanisms mitigating the human rights risks, enhancing worker safety, and mitigating the risk of legal actions against companies. They could include (non-exhaustive list):

- Establishment of maximum working temperature thresholds that account for weather conditions including humidity levels.
- Provision for social protection measures that cover workers' income in periods of work stoppages.
- Provision for the employer to adapt working conditions and arrangements, including the reduction or modification of the scheduled workday in response to extreme weather conditions.
- Provision for the employer to conduct periodic heat-risk assessments to identify some of the groups most vulnerable to spiking temperatures (older workers, pregnant workers, or even particular trades – roofers, glazers, or lone workers).
- Procedures or permits to work that specify how long people should work in situations or areas where there is a risk of heat stress.
- Investment in worker-driven technological solutions for real-time monitoring of heat conditions (HeatApps) and automating adjustments in work schedules in response to enhanced weather and climate monitoring.
- Provisions to expand worker training and awareness for heat stress recognition and emergency responses to ensure union safety representatives and supervisors are equipped to handle heat-related emergencies.
- Provision for the employer to introduce or enhance specific heat-related health and wellbeing initiatives such as awareness raising of the hazards associated with working in excessive heat conditions at inductions, safety briefings, toolbox-talks or heat-stress management workshops and training sessions on heat risks, fitness, hydration, PPE/clothing, and emergency first aid.
- Codification of the provision of additional worker support measures including:
  - Rest breaks and the introduction of shade to rest areas;
  - Shade in areas where individuals are working;
  - Free access to cool drinking water (Hydration Stations);
  - Development of Heat Illness Prevention Plans (HIPP) and other health surveillance arrangements;
  - Free high-factor sunscreen (SPF 15-50); and
  - Adapting uniform/PPE requirements where appropriate.
- Joint union-employer health and safety inspections to address working in excessive temperature situations.



Focus:
Heat Stress Indexes

The Eurogip report, Working in high heat and heatwaves, explains that other elements as well as air temperature influence heat tolerance. These include:

- air humidity,
- air circulation or speed,
- solar and thermal radiation from bodies or surfaces near the work,
- physical intensity (notably workload) and duration of work,
- the physical fitness of workers, in particular the existence of medical conditions or illnesses that increase the risk of suffering from heat stroke,
- acclimatisation of workers to working conditions, particularly heat,
- clothing worn when working in high temperatures.

Some countries that have regulated high temperatures use indices that attempt to combine some of these elements. Tables used by Canadian provinces, Washington State in the US and Japan adjust the maximum values of exposure to heat depending on the clothing worn by the worker, for example.

Safe Work Australia, the Australian Occupational Health and Safety Agency, explains why there are no maximum workplace temperature limits at work in the country:

"A single stop work temperature cannot take into account of all the factors that make working in heat dangerous, including humidity, air circulation, physical intensity and duration of work, as well as physical fitness and acclimation of workers to working conditions".

Humidity is a central element to consider in setting exposure limits to heat at work and is taken into account in the law on maximum temperatures at work in Cyprus and in the unemployment system in Italy. While high air temperature could be tolerated with low humidity, a lower temperature could become unbearable, or even fatal, in the presence of high humidity.

WBGT Wet-Bulb Globe Temperature Index

The Wet-Bulb Globe Temperature (WBGT) is a measure of the heat stress in direct sunlight, which takes into account: temperature, humidity, wind speed and solar radiation. It is used as a guide for managing workload in direct sunlight. It must be measured by specific devices and is expressed in degrees Celsius or Fahrenheit. An air temperature of 35°C does not correspond to 35°C WBGT.

When using this index, other parameters such as workload and exposure duration would have to be considered in determining possible thresholds for maximum working temperature. The table (see next page) shows a comparison of different occupational health and safety institutes and ISO's recommended exposure limits for acclimatised worker.

Humidex Index

Canada has developed the Humidex Index for the general public, which aims to determine the "felt" temperature, by combining air temperature and humidity. Depending on the Humidex values (expressed in °C), there are different alert levels:

Humidex range Comfort level:

- 20 to 29 No discomfort
- 30 to 39 Some discomfort
- 40 to 45 A lot of discomfort: avoid effort
- Above 45 Danger: possible heat stroke

These alert levels are not specific to work. In order to determine the level of danger of work activity in the heat, other factors such as wind speed, air movement, workload, radiant heat sources and physical condition must be considered. However, the CCOHS Canadian Centre for Occupational Health and Safety indicates that "under certain working conditions, Humidex could be used as an index of discomfort due to occupational exposure to the heat".

Other Heat Stress Indexes include the Corrected Effective Temperature used in Cyprus and the Heat Index used in the US state of Oregon, which combines air temperature and humidity in the shade, and the Philippine national weather services PAGASA heat Index.

Comparison of WBGT exposure limits for acclimatised[87] workers[88]

Workload	ACGIH	AIHA	OSHA	ISO	NIOSH
Resting		32.2°C		33°C	
Light	30°C	30°C	30°C	30°C	30°C
Moderate	26.7°C	26.7°C	27.8°C	28°C	28°C
Heavy			26.1-28.9°C	25-26°C	26°C
Very heavy	25°C			23-25°C	

Focus:

Carrying out a risk assessment for heat stress

The EU-OSHA European Agency for Safety and Health at Work guide, Heat at work, provides the following guidance on carrying out a risk assessment for heat stress.

Where there is a possibility of heat stress occurring, employers must assess the risk to workers. They must consider:

- Work requirements and work rate;
- Working climate, including air temperature, humidity, air movement and working near a heat source;
- Work clothing and personal protective equipment (PPE); and
- A workers' age, body type and medical factors.

(Those identified as being particularly vulnerable to heat stress include older workers and pregnant workers (Cyprus), cancer patients undergoing treatment for cancer; and people with serious neurological and mental illnesses, multiple sclerosis, and epilepsy (Greece).)

A risk assessment can help determine how severe the risk is; whether existing measures are effective; what action should be taken to control the risk; and how urgent the need to take action is.

To assess the risk, the employer should consider what the impact of the hazard is and how likely the hazard is to cause harm.

Employers should first talk to workers and their union representatives to see if they are suffering early signs of heat stress. If there is a problem, expert advice from occupational health professionals may be necessary,

The risk assessment should be part of, and aligned with, the overall workplace risk assessment. All risks should be considered, including those that may be generated by the measures to avoid heat stress.

The risk assessment should be revised regularly and when conditions change.

87 Unacclimatized workers would have greater heat expenditures during the same amount of work and temperature. Adapted from the American Industrial Hygiene Association (AIHA) [2003].

88 https://www.cdc.gov/niosh/docs/2016-106/pdfs/2016-106.pdf?id=10.26616/NIOSHPUB2016106 I p70.

Adapting to the Heat

Existing Global Responses for Workers Protections in Construction, Building Materials, Wood and Forestry Industries

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