DEVELOPING AN INTEGRATED PROTECTION FRAMEWORK TO ADDRESS OCCUPATIONAL HEAT STRESS IN GREECE

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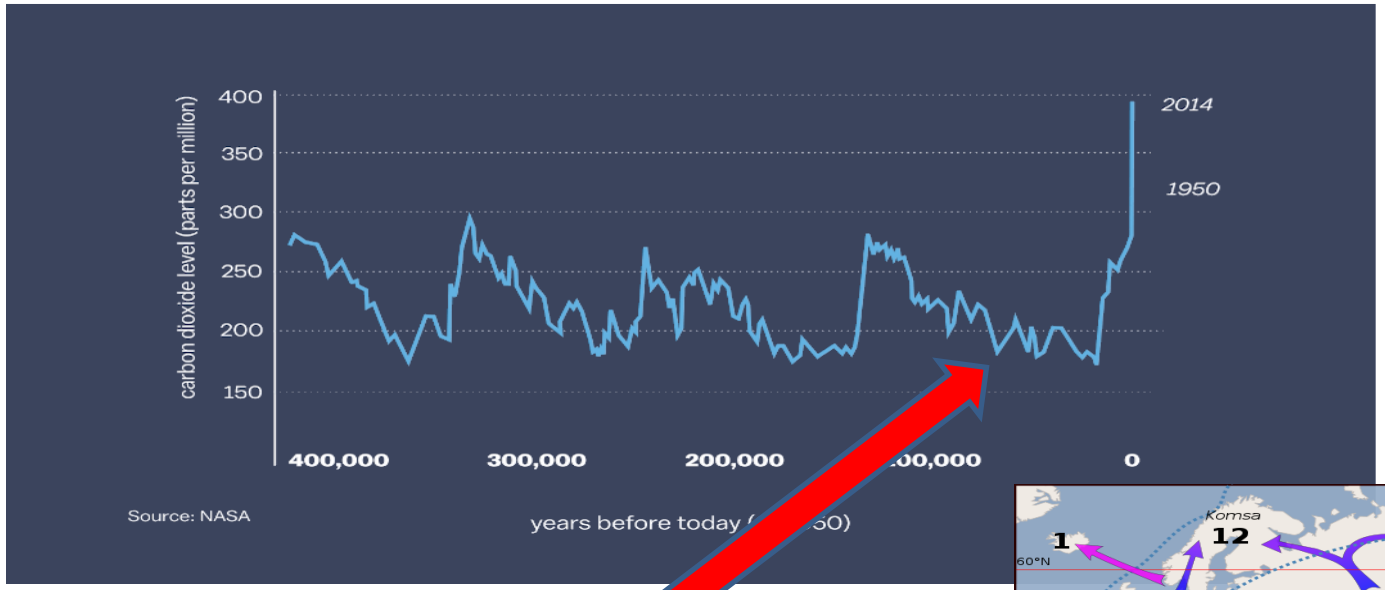
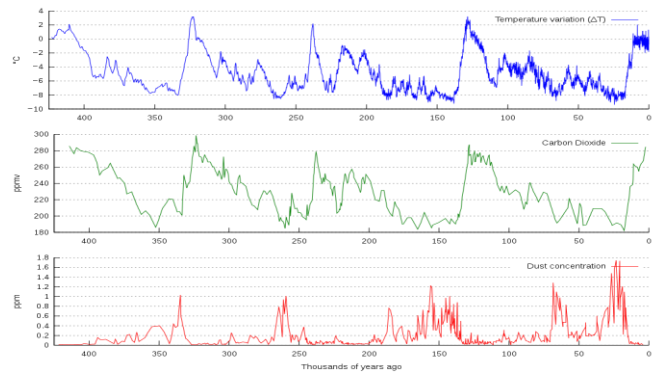
Ministry of Labour and Social Affairs
Hellenic Republic

Hellenic National Meteorological Service

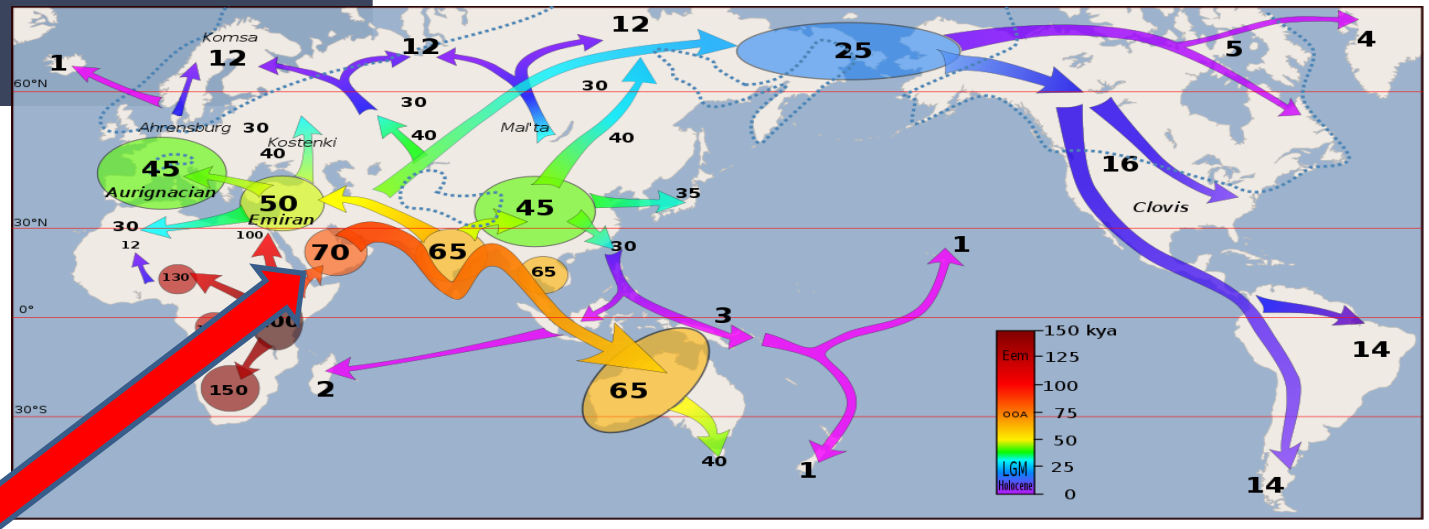
FAME LAB

Climate variations and human migration - Are workers affected?





- Accidents and illnesses
- Productivity
- Wellbeing
- Migration
- OHS is civilization



Source: Wikipedia

The Code of Hammurabi – OHS!

- 267. If the herdsman overlooks something, and an accident happens in the stable, then the herdsman is at fault for the accident which he has caused in the stable, and he must compensate the owner for the cattle or sheep

Occupational heat stress in legislation

- Occupational heat stress has not been adequately addressed in legislation not only in Greece but also internationally and is covered only by relevant circulars published at the beginning of each summer
- Exceptions: China, Cyprus, Qatar, and Malaysia
- Why? EU has so many dedicated Directives?
- For sure there is an urge now

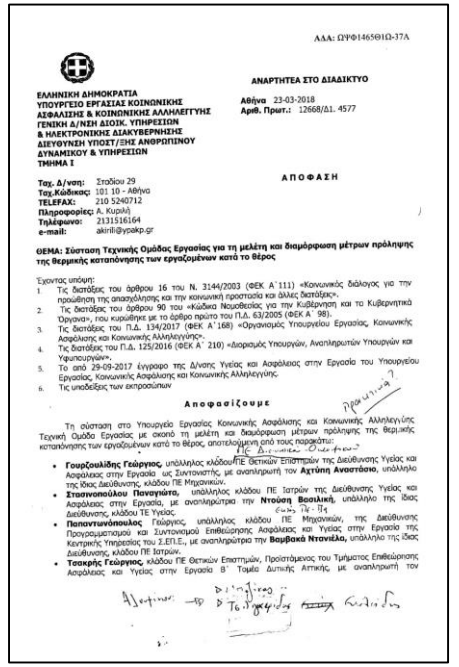
Task Force in the Hellenic Ministry of Labour & Social Affairs

- Literature review
  - different thermal stress indicators
  - the need for a simplified indicator
  - the ‘old’ collective bargains (36, 37, 38^{o} C)

- The case of Cyprus

- Determining activity / categories / measurements
  - industry
  - outdoor activities

- **Agreement** on the measures (Workers and Employers Associations, Workplace Inspectors, OHS Experts, Research & Measurements Center of OHS Hazardous Agents)



ΑΔΑ: ΩΨΦ1465ΘΠΩ-37Α

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΕΡΓΑΣΙΑΣ ΚΟΙΝΩΝΙΚΗΣ ΑΣΦΑΛΙΣΗΣ & ΚΟΙΝΩΝΙΚΗΣ ΑΛΛΗΛΕΓΓΥΗΣ
ΓΕΝΙΚΗ Δ/ΝΣΗ ΔΙΟΙΚ. ΥΠΗΡΕΣΙΩΝ & ΗΛΕΚΤΡΟΝΙΚΗΣ ΔΙΑΚΥΒΕΡΝΗΣΗΣ
ΔΙΕΥΘΥΝΣΗ ΥΠΟΣΤ/ΞΗΣ ΑΝΘΡΩΠΙΝΟΥ ΔΥΝΑΜΙΚΟΥ & ΥΠΗΡΕΣΙΩΝ
ΤΜΗΜΑ Ι

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ΑΝΑΡΤΗΤΕΑ ΣΤΟ ΔΙΑΔΙΚΤΥΟ

Αθήνα 23-03-2018
Αριθ. Πρωτ.: 12668/Δ1. 4577

ΑΠΟΦΑΣΗ

ΘΕΜΑ: Σύσταση Τεχνικής Ομάδας Εργασίας για τη μελέτη και διαμόρφωση μέτρων πρόληψης της θερμικής καταπόνησης των εργαζομένων κατά το θέρος

Έχοντας υπόψη:
1. Τις διατάξεις του άρθρου 16 του Ν. 3144/2003 (ΦΕΚ Α΄111) «Κοινωνικός διάλογος για την προώθηση της απασχόλησης και την κοινωνική προστασία και άλλες διατάξεις».
2. Τις διατάξεις του άρθρου 90 του «Κώδικα Νομοθεσίας για την Κυβέρνηση και το Κυβερνητικά Όργανα», που κυρώθηκε με το άρθρο πρώτο του Π.Δ. 63/2005 (ΦΕΚ Α΄ 98).
3. Τις διατάξεις του Π.Δ. 134/2017 (ΦΕΚ Α΄168) «Οργανισμός Υπουργείου Εργασίας, Κοινωνικής Ασφάλισης και Κοινωνικής Αλληλεγγύης».
4. Τις διατάξεις του Π.Δ. 125/2016 (ΦΕΚ Α΄ 210) «Διορισμός Υπουργών, Αναπληρωτών Υπουργών και Υφυπουργών».
5. Το από 29-09-2017 έγγραφο της Δ/νσης Υγείας και Ασφάλειας στην Εργασία του Υπουργείου Εργασίας, Κοινωνικής Ασφάλισης και Κοινωνικής Αλληλεγγύης.
6. Τις υποδείξεις των εκπροσώπων

Αποφασίζουμε

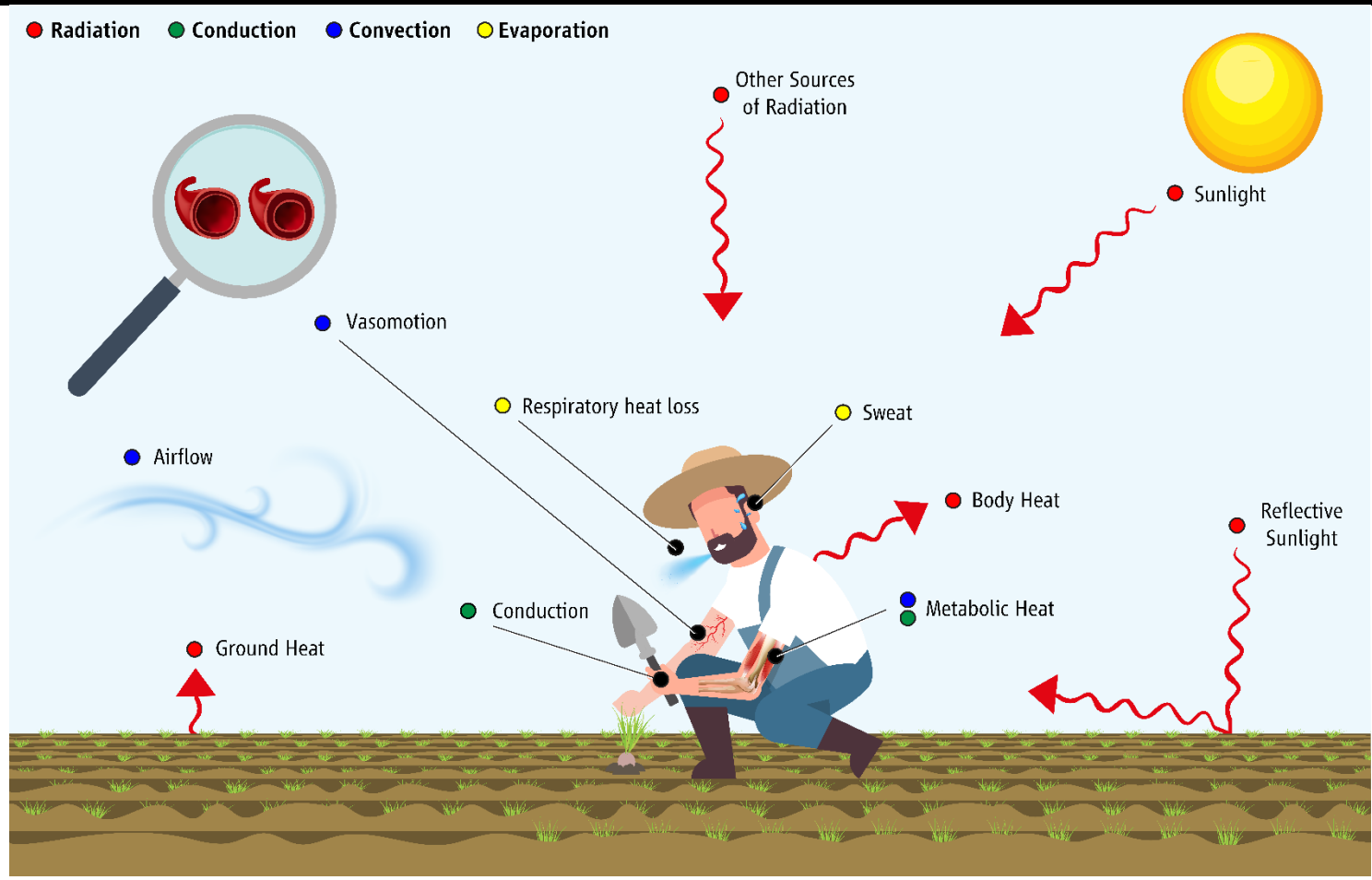
Τη σύσταση στο Υπουργείο Εργασίας Κοινωνικής Ασφάλισης και Κοινωνικής Αλληλεγγύης Τεχνική Ομάδα Εργασίας με σκοπό τη μελέτη και διαμόρφωση μέτρων πρόληψης της θερμικής καταπόνησης των εργαζομένων κατά το θέρος, αποτελούμενη από τους παρακάτω:

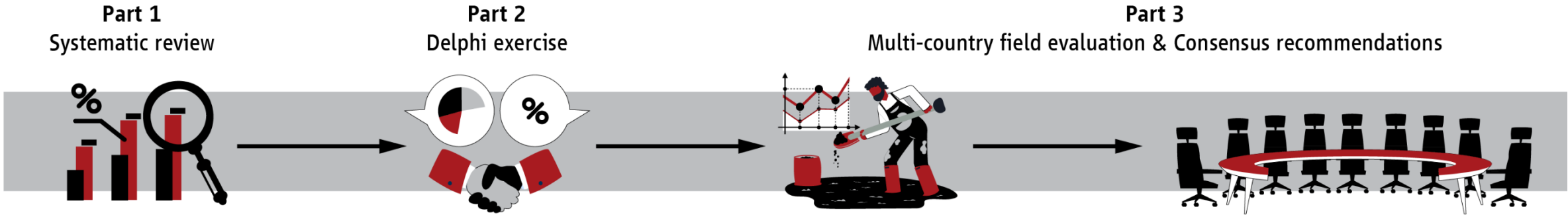
- **Γουζουλίδης Γεώργιος**, υπάλληλος κλάδου ΠΕ Θετικών Επιστημών της Διεύθυνσης Υγείας και Ασφάλειας στην Εργασία ως Συντονιστής, με αναπληρωτή τον **Αχτύπη Αναστάσιο**, υπάλληλο της ίδιας Διεύθυνσης, κλάδου ΠΕ Μηχανικών.
- **Σταυρουσούλου Παναγιώτα**, υπάλληλος κλάδου ΠΕ Ιατρών της Διεύθυνσης Υγείας και Ασφάλειας στην Εργασία, με αναπληρώτρια την **Ντούση Βασιλική**, υπάλληλο της ίδιας Διεύθυνσης, κλάδου ΤΕ Υγείας.
- **Παπαντωνόπουλος** Γεώργιος, υπάλληλος κλάδου ΠΕ Μηχανικών, της Διεύθυνσης Πρωτογάμαστιγού και Συντονισμού Επιθεώρησης Ασφάλειας και Υγείας στην Εργασία της Κεντρικής Υπηρεσίας του Σ.ΕΠ.Ε., με αναπληρώτρια την **Βαμβακά Ντανιέλα**, υπάλληλο της ίδιας Διεύθυνσης, κλάδου ΠΕ Ιατρών.
- **Τσακρής Γεώργιος**, κλάδου ΠΕ Θετικών Επιστημών, Προϊστάμενος του Τμήματος Επιθεώρησης Ασφάλειας και Υγείας στην Εργασία Β΄ Τομέα Δυτικής Αττικής, με αναπληρωτή τον

Thermal stress indicators – How is the weather like?

- Thermal stress indicators are **equations combining** the interaction of factors such as air temperature, humidity, wind, and solar radiation **to describe** the **thermal environment** and **how it impacts** our body

Ioannou et al., 2022 a, b, c; Temperature





Thermal stress indicators

- **340** thermal stress indicators developed between 200 BC and 2019 AD to assess the heat stress and physiological strain experienced by people performing various activities over a wide operating range and conditions
  - **153** nomograms, specific instruments, and complex models
  - **187** formulas mathematically calculated utilizing meteorological data (air temperature, relative humidity, wind speed, and solar radiation)
    - **61** have been designed for use in occupational settings

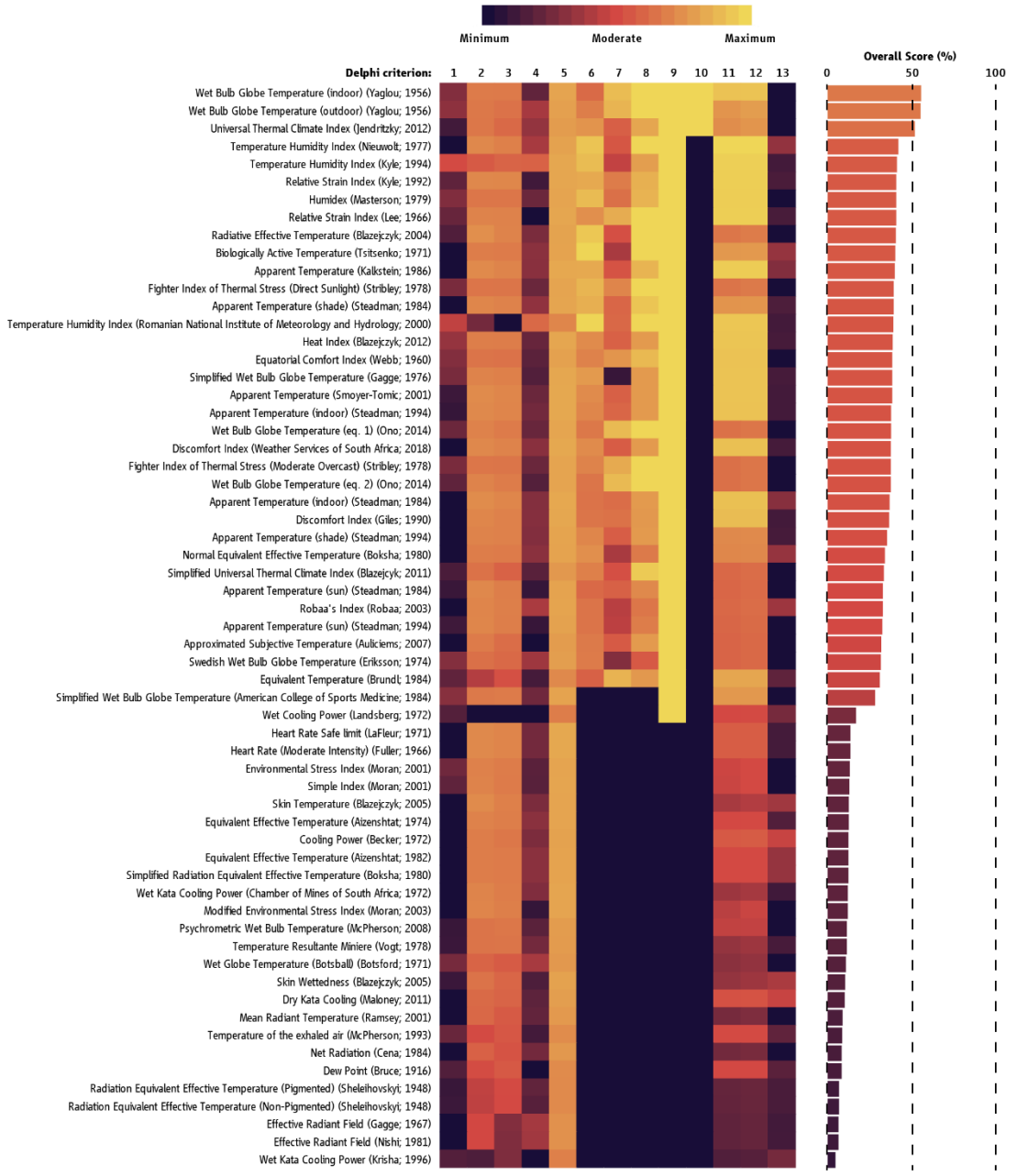
Ioannou et al., 2022 a, b, c; Temperature

Thermal stress indicators

- When evaluated against data from a multi-country study, the thermal stress indicators scored from 4.7 to 55.4%

- Most efficacious thermal stress indicators:
  - indoor Wet-Bulb Globe Temp. (55.4%)
  - outdoor Wet-Bulb Globe Temp. (55.1%)
  - Universal Thermal Climate Index (51.7%)

Ioannou et al., 2022 a, b, c; Temperature

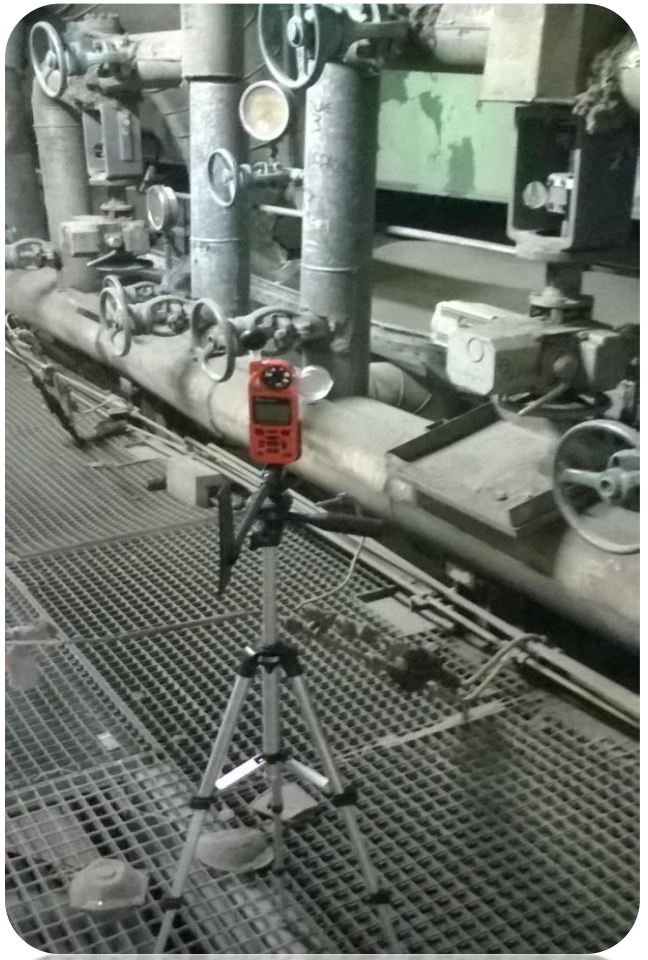


Heat stress is a hazardous agent – EU Directives' approach

- **OHS framework**
  - Employer's responsibility
  - Written risk assessment
  - Limits (ISO 7243: 2016, WBGT)
    - Exposure Limit values (1^{o} C)
    - Action levels
  - Safety Officer and Occupational Physician (health surveillance)
  - Technical and organizational measures
  - Education, training and consultation of workers
  - Derogations

- Worker categories
  - indoor areas / air conditioning
    - do they function properly?
  - outdoor areas
  - indoor areas – constant heat stress
  - special categories of workers
    - Vulnerable (health issues, pregnant, young people)
    - special duties

Measurements

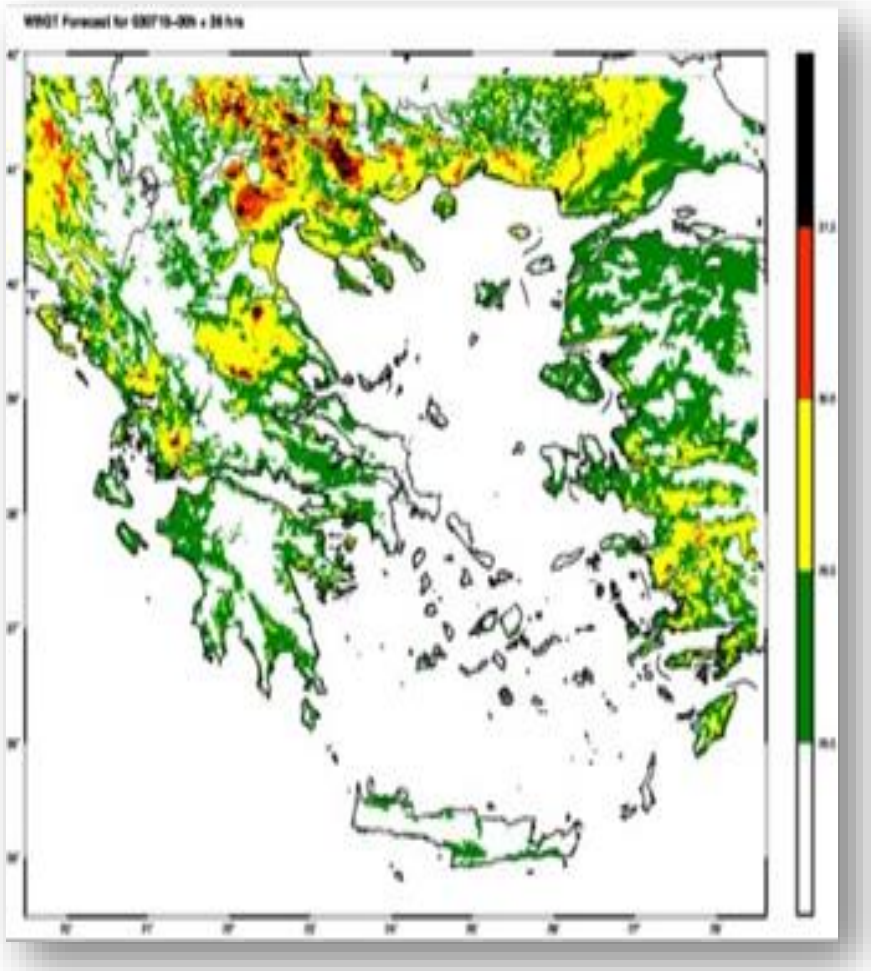


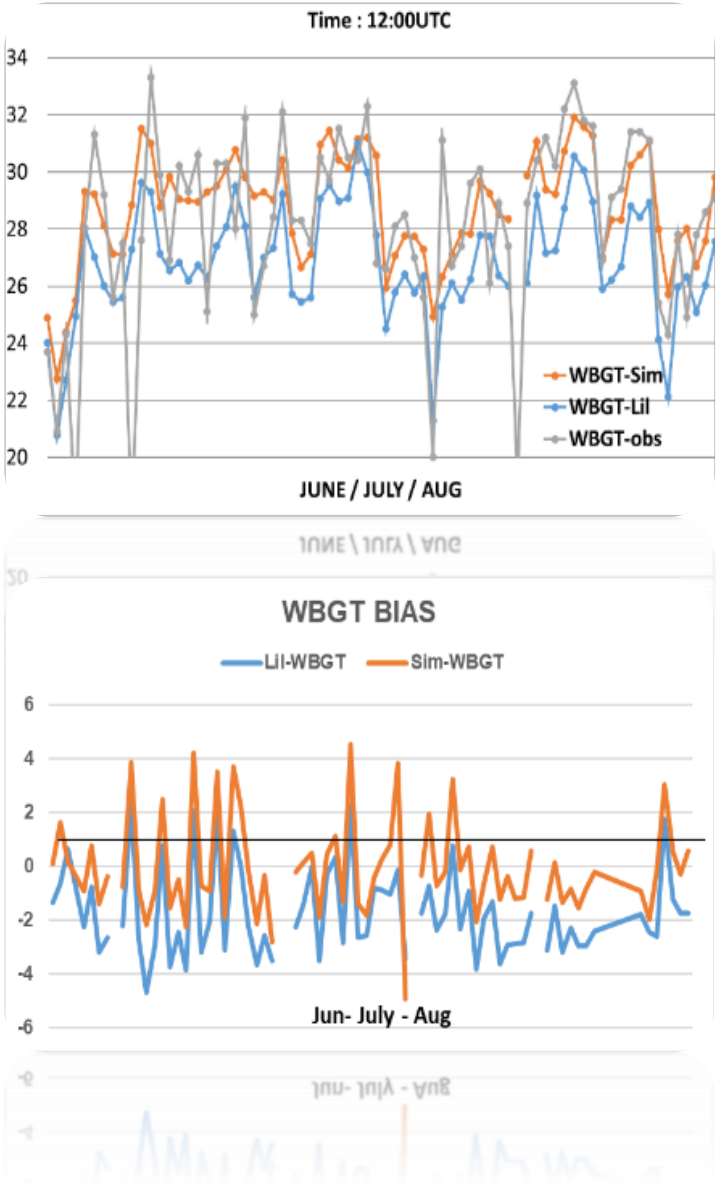
Measurements

Measurements

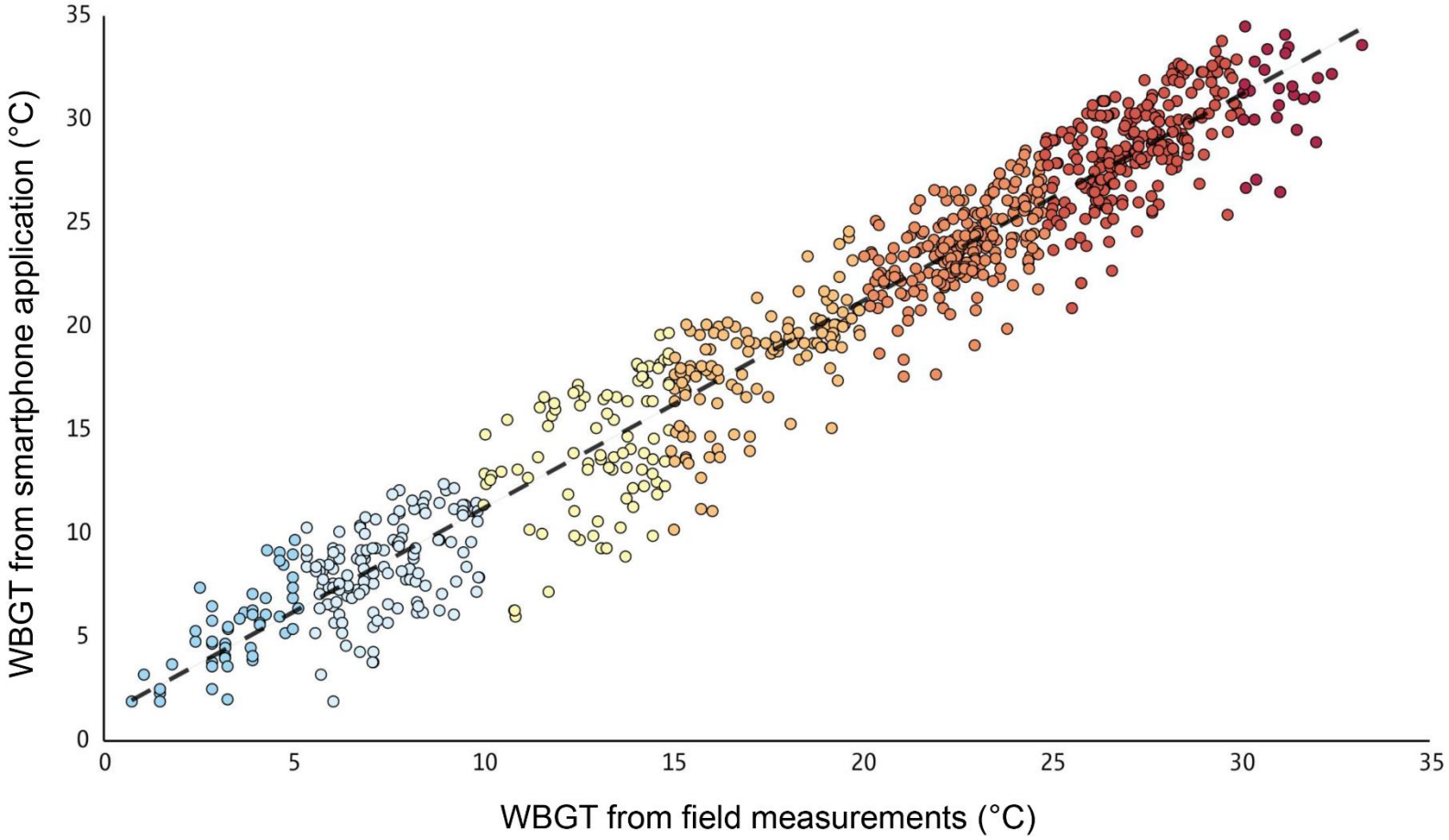
Measurements (WBGT and Hellenic Meteorological Service)

Hellenic meteo service: the web-based prediction





FAME Lab WBGT application



EU Directive legal text format

Ministerial Decision on the minimum health and safety requirements for the exposure of workers to risks arising from natural agents

(Heat stress)

Athens
April 2021

SECTION I: GENERAL PROVISIONS

Article 1. Purpose and scope

1. This Ministerial Decision lays down minimum requirements concerning the protection of workers from risks to their safety and health arising or likely to arise from exposure to heat.

2. The requirements of this Ministerial Decision apply to activities in which workers are or may be exposed to heat stress hazards as a result of their work. Particular attention shall be paid to heat stress during the summer, particularly in hot weather..

3. This Ministerial Decision shall apply in full to the entire sector referred to in paragraph 1, without prejudice to more stringent and/or specific provisions of this Decision.

Article 2. Definitions

Heat stress is a term that describes a series of physiological manifestations that occur as a result of internal heat accumulation and an increase in the temperature of the human body. Occupational heat stress occurs either solely as a result of prolonged exposure of workers to an extremely hot working environment, or as a result of high ambient room temperatures, combined with the performance of tasks requiring greater physical activity or the use of special clothing or protective equipment.

For the purposes of the present Ministerial Decision, the following definitions shall apply:

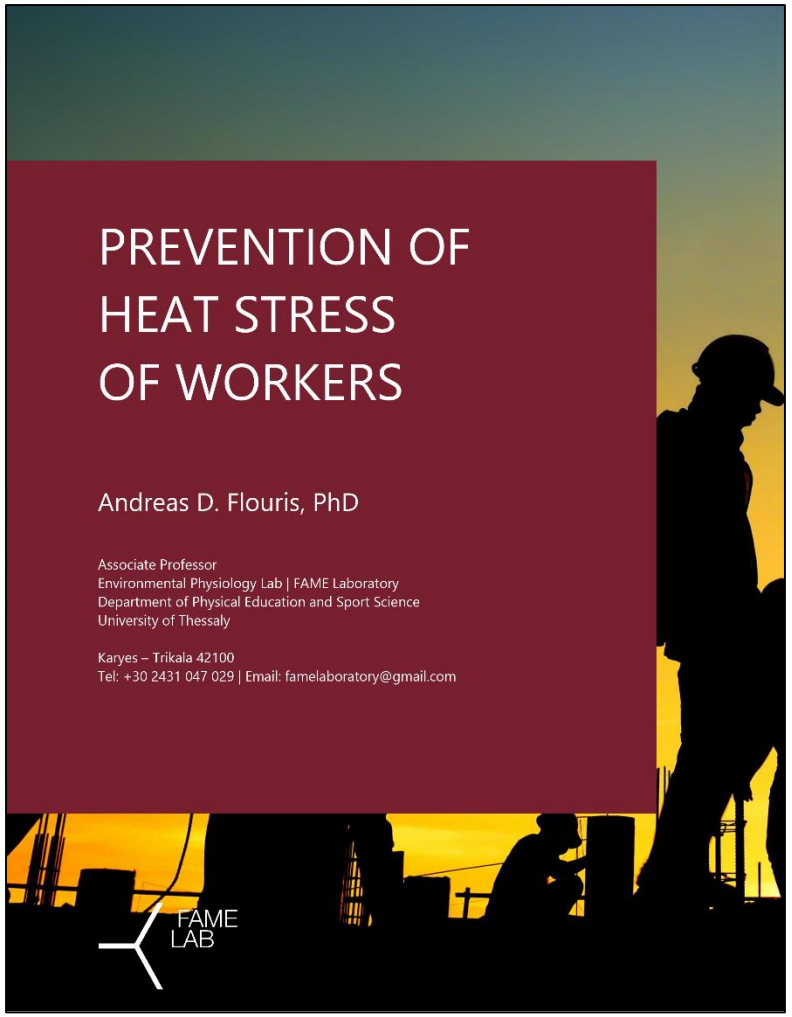
a) The bioclimatic indicator used as an indicator of foreseeable hazards is defined as the natural wet bulb and black globe temperature (internationally known as "Wet-Bulb Globe Temperature" or "WBGT"). The WBGT index estimates the heat stress experienced by a human being, which is a function of environmental parameters and the heat generated within the body by metabolic activity. The WBGT index (unit of measurement: °C) is calculated for indoor and outdoor areas using the equations presented in Annex 1 as specified in international standard ISO 7243:2017, point 5. Annex 1 also includes a widely accepted simplified equation for indoor and outdoor use, in cases where only air temperature and relative humidity measurements are available, as well as the calculation of this index for a wide range of temperature and humidity. Finally, it is possible to automatically calculate the simplified humidity index at the following link: www.famelab.gr/meteo

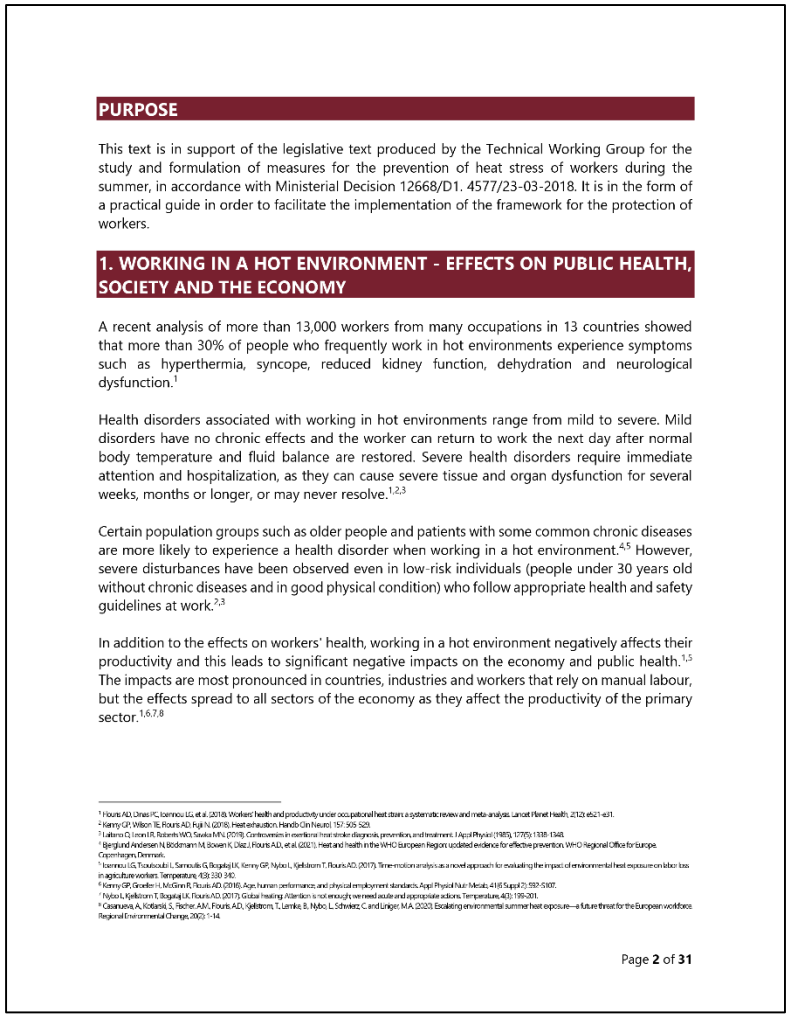
b) The intensity of work, as defined by the international standard ISO 7243:2017, Annex F,[2] is defined as:

i) Light intensity work (average metabolic rate: 180 W) is defined as work involving mild manual activity (using hands or a combination of hands and feet) in a sitting position, driving, light work in a standing position and occasional walking. Typical office work is usually characterised by this intensity.

ii) Moderate-intensity work (average metabolic rate: 300 W) is defined as work involving normal walking with prolonged moderate-intensity activity with the arms and forearms, moderate activity with the arms and legs, moderate activity with the arms and torso or mild pushing and pulling of light loads. Typical light-intensity work in factories, retail and catering establishments, as well as light gardening tasks are usually characterised by this intensity.

Practical guide for workers, employers, and OHS professionals





PURPOSE

This text is in support of the legislative text produced by the Technical Working Group for the study and formulation of measures for the prevention of heat stress of workers during the summer, in accordance with Ministerial Decision 12668/D1. 4577/23-03-2018. It is in the form of a practical guide in order to facilitate the implementation of the framework for the protection of workers.

1. WORKING IN A HOT ENVIRONMENT - EFFECTS ON PUBLIC HEALTH, SOCIETY AND THE ECONOMY

A recent analysis of more than 13,000 workers from many occupations in 13 countries showed that more than 30% of people who frequently work in hot environments experience symptoms such as hyperthermia, syncope, reduced kidney function, dehydration and neurological dysfunction.[1]

Health disorders associated with working in hot environments range from mild to severe. Mild disorders have no chronic effects and the worker can return to work the next day after normal body temperature and fluid balance are restored. Severe health disorders require immediate attention and hospitalization, as they can cause severe tissue and organ dysfunction for several weeks, months or longer, or may never resolve.[1,2,3]

Certain population groups such as older people and patients with some common chronic diseases are more likely to experience a health disorder when working in a hot environment.[4,5] However, severe disturbances have been observed even in low-risk individuals (people under 30 years old without chronic diseases and in good physical condition) who follow appropriate health and safety guidelines at work.[2,3]

In addition to the effects on workers' health, working in a hot environment negatively affects their productivity and this leads to significant negative impacts on the economy and public health.[1,5] The impacts are most pronounced in countries, industries and workers that rely on manual labour, but the effects spread to all sectors of the economy as they affect the productivity of the primary sector.[1,6,7,8]

[1] Flouris AD, Dinas PC, Ioannou LG, et al. (2018). Workers' health and productivity under occupational heat stress: a systematic review and meta-analysis. Lancet Planet Health; 2(12): e521-e531.
[2] Kenny GP, Wilson TE, Flouris AD, Inglis N. (2019). Heat exhaustion. Handb Clin Neurol; 157: 505-529.
[3] Lugo-Amador NM, Rothstein J, Lawrence C. (2004). Heatstroke. Curr Opin Pediatr; 16(3): 281-287.
[4] Bergland Andersen N, Bodmann M, Bowen K, Díaz J, Flouris AD, et al. (2021). Heat and health in the WHO European Region: updated evidence for effective prevention. WHO Regional Office for Europe. Copenhagen, Denmark.
[5] Ioannou LG, Tsoutsoubi L, Samoutis G, Bogataj LK, Kenny GP, Nybo L, Kjellstrom T, Flouris AD. (2017). Time-motion analysis as a novel approach for evaluating the impact of environmental heat exposure on labor loss in agriculture workers. Temperature; 4(3): 330-340.
[6] Kenny GP, Groeller H, McGinn R, Flouris AD. (2016). Age, human performance, and physical employment standards. Appl Physiol Nutr Metab; 41(6 Suppl 2): S92-S107.
[7] Nybo L, Kjellstrom T, Bogataj LK, Flouris AD. (2017). Global heating: Attention is not enough, we need acute and appropriate actions. Temperature; 4(3): 199-201.
[8] Casanueva A, Kotlarski S, Fischer AM, Flouris AD, Kjellstrom T, Lemke B, Nybo L, Schwierz C, and Erlanger, M.A. (2020). Escalating environmental summer heat exposure—a future threat for the European workforce. Regional Environmental Change, 20(2): 1–14.

2022 Circular from the Ministry

ΑΔΑ: ΨΚΘ046ΜΤΛΚ-ΡΜΩ

Ministry of Digital Governance, Hellenic Republic

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΕΡΓΑΣΙΑΣ ΚΑΙ ΚΟΙΝΩΝΙΚΩΝ ΥΠΟΘΕΣΕΩΝ
ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΕΡΓΑΣΙΑΚΩΝ ΣΧΕΣΕΩΝ
ΓΕΝΙΚΗ ΔΙΕΥΘΥΝΣΗ ΕΡΓΑΣΙΑΚΩΝ ΣΧΕΣΕΩΝ, ΥΓΕΙΑΣ & ΑΣΦΑΛΕΙΑΣ ΣΤΗΝ ΕΡΓΑΣΙΑ ΚΑΙ ΕΝΤΑΞΗΣ ΣΤΗΝ ΕΡΓΑΣΙΑ
ΔΙΕΥΘΥΝΣΗ ΥΓΕΙΑΣ & ΑΣΦΑΛΕΙΑΣ ΣΤΗΝ ΕΡΓΑΣΙΑ

ΣΩΜΑ ΕΠΙΘΕΩΡΗΣΗΣ ΕΡΓΑΣΙΑΣ

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ΑΝΑΡΤΗΤΕΑ ΣΤΟ ΔΙΑΔΙΚΤΥΟ

Αθήνα, 15-06-2022

Αρ. πρωτ.: 56163

ΕΓΚΥΚΛΙΟΣ

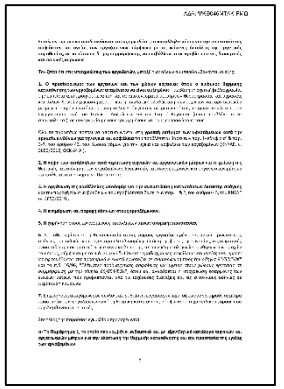
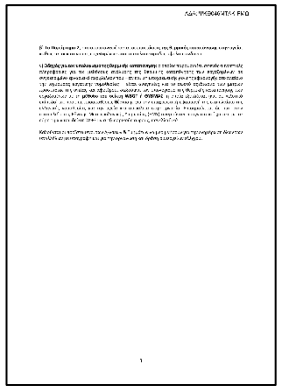
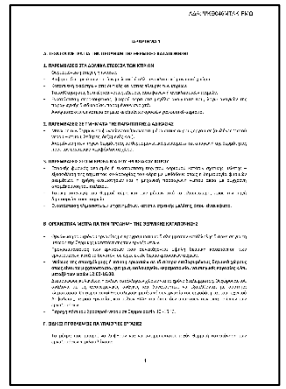
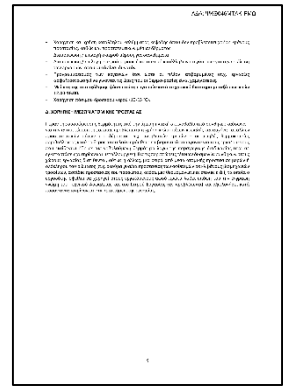
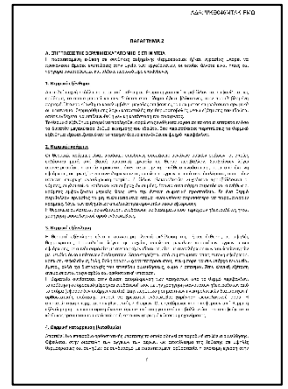
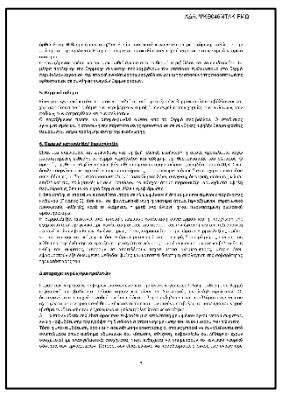
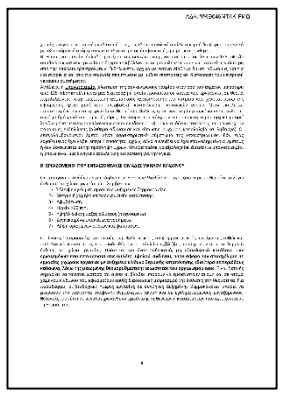
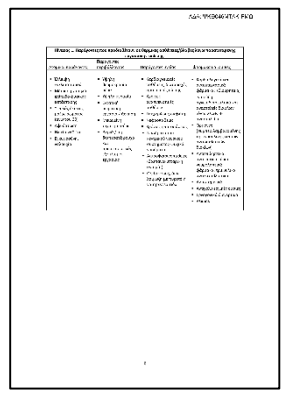
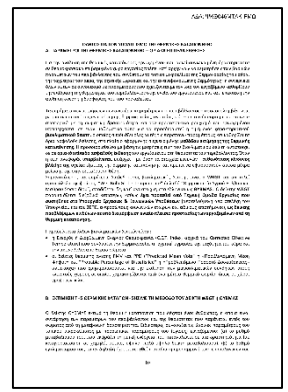
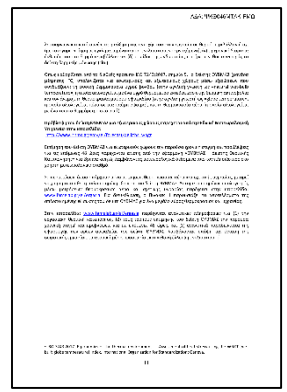
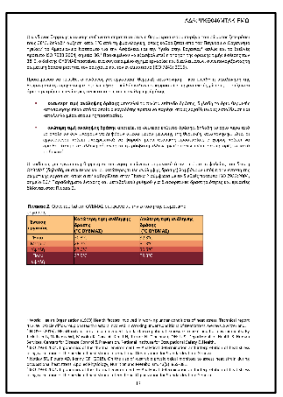
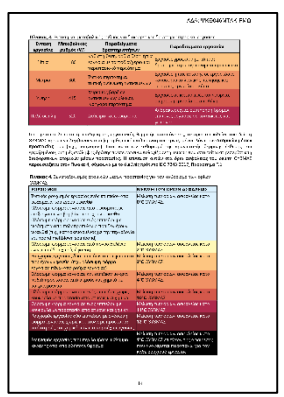
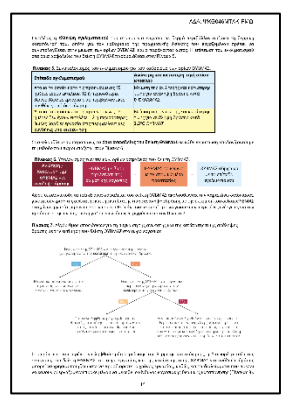
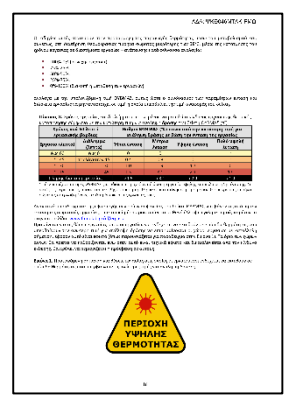
ΠΡΟΣ: **Ως ο Πίνακας αποδεκτών**

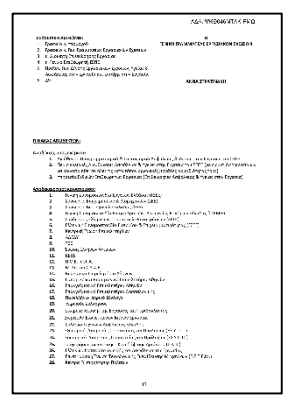
Θέμα: Πρόληψη της θερμικής καταπόνησης των εργαζομένων

Την περίοδο του θέρους λαμβάνει χώρα ιδιαίτερη καταπόνηση των εργαζομένων που οφείλεται στη συνέργεια μετεωρολογικών παραγόντων το εξωτερικού περιβάλλοντος ή/και παραμέτρων μικροκλίματος του εσωτερικού εργασιακού χώρου, σωματικής εργασίας και προστατευτικού ρουχισμού. Η δραστηριότητα των κατά τόπους υπηρεσιών Επιθεώρησης Ασφάλειας και Υγείας στην Εργασία του ΣΕΠΕ την περίοδο αυτή πρέπει να επικεντρώνεται σε **προληπτικούς ελέγχους** εφαρμογής μέτρων που στοχεύουν στη μείωση της θερμικής καταπόνησης των εργαζομένων. Άμεση δε ανταπόκριση πρέπει να υπάρχει στις περιπτώσεις σχετικών καταγγελιών εργαζομένων ή συλλογικών τους φορέων.

Οι παραπάνω έλεγχοι πρέπει να είναι εντατικοί σε όλους τους εργασιακούς χώρους όπου αναμένεται ότι θα υπάρξει μεγαλύτερη θερμική καταπόνηση, προπάντων κατά τις περιόδους που εξαγγέλλεται από την Ε.Μ.Υ. η επικράτηση συνθηκών καύσωνα. Προτεραιότητα πρέπει να δίνεται στις **υπαίθριες εργασίες** (π.χ. σε οικοδομές, οδικά και άλλα τεχνικά έργα) και **στις εργασίες σε στεγασμένους χώρους όπου λόγω της φύσης των παραγωγικών διαδικασιών** μπορεί να υπάρχει επί πλέον θερμική καταπόνηση από υψηλές τιμές θερμοκρασίας-υγρασίας και ακτινοβολούμενη θερμότητα (π.χ. σε χυτήρια, μεταλλουργίες, βιομηχανίες πλαστικών, μαγειρεία κ.α.) και ιδίως στις **χειρωνακτικές εργασίες** (π.χ. μεταφορά βαρέων αντικειμένων, οικοδομικών υλικών).

Κατά τους ελέγχους, οι εργοδότες πρέπει να ενημερώνονται για τις επιπτώσεις στην υγεία (θερμική εξάντληση, θερμοπληξία κ.ά.) που εγκυμονούν οι υψηλές θερμοκρασίες και οι συνθήκες καύσωνα για την υγεία και την ασφάλεια των εργαζομένων – ιδιαίτερα εκείνων που ανήκουν σε **ομάδες υψηλού κινδύνου**. Η ένταξη των εργαζομένων στις παραπάνω ομάδες θα γίνεται από τον Ιατρό Εργασίας της επιχείρησης και, όπου δεν προβλέπεται η απασχόληση ιατρού Εργασίας, με ιατρική βεβαίωση που θα προσκομίζει ο ίδιος ο εργαζόμενος.



2022 Circular from the Ministry

- Minimum – maximum limits (°C WBGT)

Work intensity (W)	Minimum limit (°C WBGT)	Maximum limit (°C WBGT)
Low (180)	30.8	32.3
Moderate (300)	28.2	31.3
High (415)	27.6	30.5
Very high (520)	27.9	29.8

2022 Circular from the Ministry

- Minimum / maximum limit corrections based on
  - work intensity
  - personal protective measures
  - acclimatization status
- First state of vigilance comes from the prediction of the Meteorological Service (and the smartphone application)
- In situ measurements (smartphone application, simple thermohydrometer, calculations, WBGT device)
- The employer applies the overall legislation
- Workplace Inspectors check compliance

2022 Circular from the Ministry

Time per 60 minutes working shift		WBGT Temperature degrees (°C) above the minimum value for action based on work intensity			
Work (minutes)	**Break (minutes)**	**Mild intensity**	**Moderate intensity**	**High intensity**	**Very high intensity**
Up to 60	Up to 0	0	0	*	*
" 45	at least 15	0.4	0.8	0	*
" 30	" 30	1.0	1.9	1.2	0
" 15	" 45	1.5	3.1	2.9	1.9
Complete stoppage of work		>1.5	>3.1	>2.9	>1.9

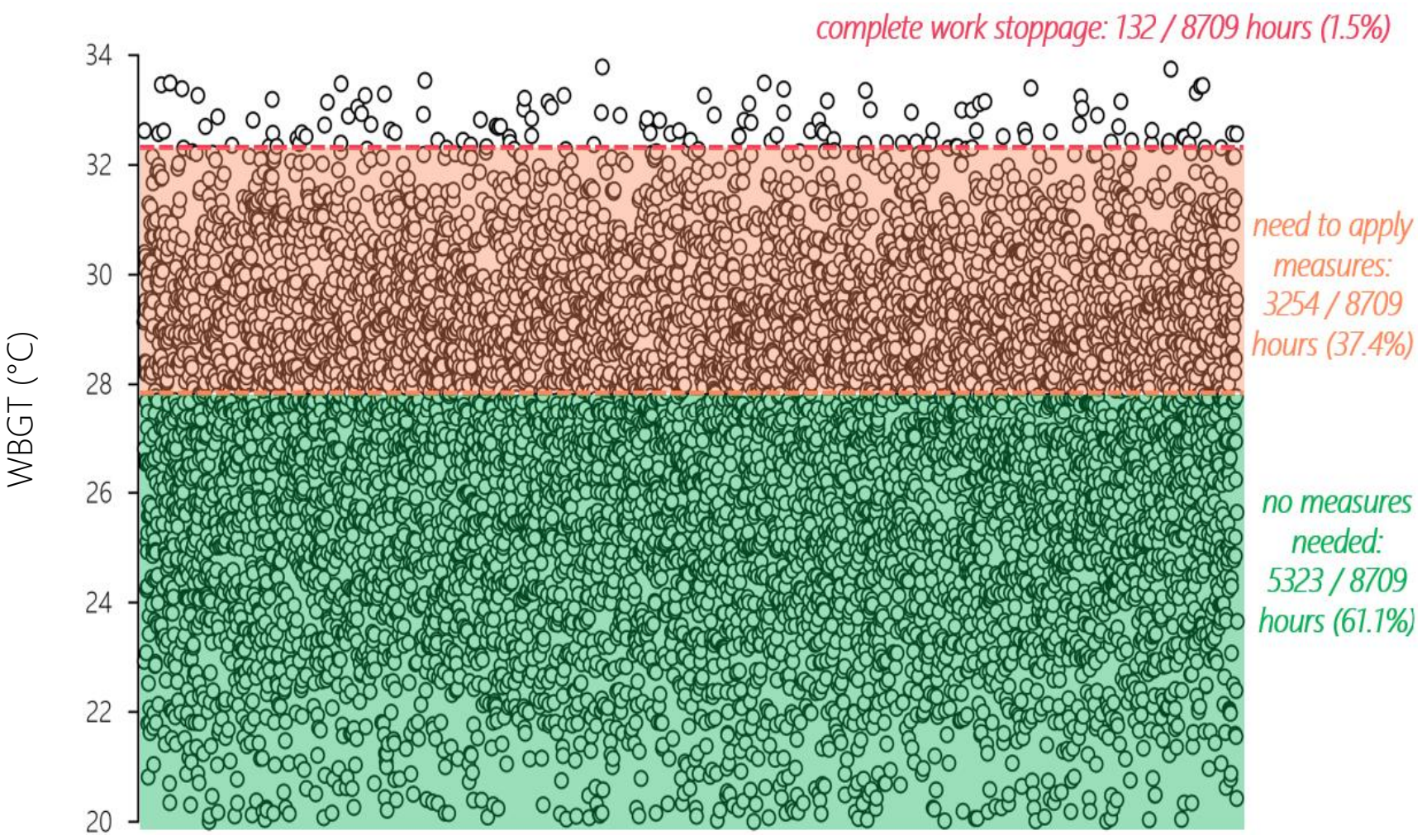
*: no WBGT values are provided for continuous or almost continuous high and very high intensity work. In these cases, an accurate assessment of heat stress by core body temperature measurements of workers during their work is required.

Pilot phase 2021-2023

- Enterprises:
  - TITAN Grinding plant Elefsina
  - Aluminium of Greece
  - Heracles General Cement
  - Piraeus Port Authority
  - Hellenic Fire Service
  - Public Power Corporation
  - Hellenic Air Force
  - Hellenic Post
  - Hellenic National Meteorological Service
  - Hellenic Authority of Geological & Mineral Surveys
  - VICTUS Networks
  - Organization Earth, NGO
  - Albatros Spa Resort Hotel
  - Kolovou, K., Sons Ltd, elevators.

- Workers/Employers Associations:
  - Association of Mining Companies
  - Hellenic Association of Installation and Maintenance Craftsmen
  - General Confederation of Greek Workers
  - Pan-Hellenic Association of Technicians Employed in Live Audiovisual Events
  - Hellenic Event Rental Companies Association
  - East Crete Union of Salesclerks and Employees of Private Enterprises

Pilot phase 2021-2023



- The OHS framework is also applicable for occupational heat stress
- Down times are small
- Applied measures will also improve productivity
- Occupational safety and health summit 14,15.5.2023, Stockholm.

Swedish Presidency of the Council of the European Union

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DEVELOPING AN INTEGRATED PROTECTION FRAMEWORK TO ADDRESS OCCUPATIONAL HEAT STRESS IN GREECE

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Thank you for your attention!

Ministry of Labour and Social Affairs
Hellenic Republic

Hellenic National Meteorological Service

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