

Bulletin n°40

Veille thermique

Période : août 2026

Objectifs :

L'INRS est de plus en plus sollicité sur des questions concernant les activités en entreprise par forte chaleur : les activités en extérieur, l'été en période de canicule, mais aussi les activités en intérieur, dans des lieux aux conditions thermiques extrêmes. L'objectif de cette veille est de se tenir informé sur ces thématiques, dans une période où la problématique thermique croît avec les changements climatiques.

La bibliographie extraite de la base de données INRS-Biblio, permet la consultation des ressources en version PDF.

Les liens mentionnés dans le bulletin donnent accès aux documents sous réserve d'un abonnement à la ressource.

La validation des informations fournies (exactitude, fiabilité, pertinence par rapport aux principes de prévention, etc.) est du ressort des auteurs des articles signalés dans la veille. Les informations ne sont pas le reflet de la position de l'INRS.

Table des matières

INRS-Biblio	2
• Documents INRS	2
• Documents non-INRS	3
EPI, matériaux protecteurs/refroidissants	4
Outils et capteurs de mesure	7
Travail par fortes chaleurs et périodes de canicule	8
Travail dans une ambiance thermique extrême	12
Webinaire(s)	13
Actualités août 2026.....	14

INRS-Biblio

- Documents INRS

INRS.

Travail en période de forte chaleur : BTP - Travaux en extérieur.

IC Brochure - Solutions de prévention. Paris: Institut national de recherche et de sécurité (INRS). p. 2.

Les épisodes de forte chaleur se multiplient et exposent les travailleurs à des risques graves pour leur santé et leur sécurité. L'INRS met à disposition des entreprises de nouvelles fiches "Solutions de prévention" adaptées à 6 secteurs d'activité. Cette fiche traite du BTP et des travaux en extérieur. L'objectif est d'aider les entreprises à mettre en place les solutions de prévention les plus pertinentes.

INRS.

Travail en période de forte chaleur : Commerce et restauration.

IC Brochure - Solutions de prévention. Paris: Institut national de recherche et de sécurité (INRS). p. 2.

Les épisodes de forte chaleur se multiplient et exposent les travailleurs à des risques graves pour leur santé et leur sécurité. L'INRS met à disposition des entreprises de nouvelles fiches "Solutions de prévention" adaptées à 6 secteurs d'activité. Cette fiche traite du commerce et de la restauration. L'objectif est d'aider les entreprises à mettre en place les solutions de prévention les plus pertinentes.

INRS.

Travail en période de forte chaleur : Industrie et ateliers.

IC Brochure - Solutions de prévention. Paris: Institut national de recherche et de sécurité (INRS). p. 2.

Les épisodes de forte chaleur se multiplient et exposent les travailleurs à des risques graves pour leur santé et leur sécurité. L'INRS met à disposition des entreprises de nouvelles fiches "Solutions de prévention" adaptées à 6 secteurs d'activité. Cette fiche traite du secteur de l'industrie et des ateliers. L'objectif est d'aider les entreprises à mettre en place les solutions de prévention les plus pertinentes.

INRS.

Travail en période de forte chaleur : Transport et logistique.

IC Brochure - Solutions de prévention. Paris: Institut national de recherche et de sécurité (INRS). p. 2.

Les épisodes de forte chaleur se multiplient et exposent les travailleurs à des risques graves pour leur santé et leur sécurité. L'INRS met à disposition des entreprises de nouvelles fiches "Solutions de prévention" adaptées à 6 secteurs d'activité. Cette fiche traite du secteur du transport et de la logistique. L'objectif est d'aider les entreprises à mettre en place les solutions de prévention les plus pertinentes.

INRS.

Travail en période de forte chaleur : Travail de bureau.

IC Brochure - Solutions de prévention. Paris: Institut national de recherche et de sécurité (INRS). p. 2.

Les épisodes de forte chaleur se multiplient et exposent les travailleurs à des risques graves pour leur santé et leur sécurité. L'INRS met à disposition des entreprises de nouvelles fiches "Solutions de prévention" adaptées à 6 secteurs d'activité. Cette fiche traite du travail de bureau. L'objectif est d'aider les entreprises à mettre en place les solutions de prévention les plus pertinentes.

INRS.

Travail en période forte chaleur : Aide à la personne.

IC Brochure - Solutions de prévention. Paris: Institut national de recherche et de sécurité (INRS). p. 2.

Les épisodes de forte chaleur se multiplient et exposent les travailleurs à des risques graves pour leur santé et leur sécurité. L'INRS met à disposition des entreprises de nouvelles fiches "Solutions de prévention" adaptées à 6 secteurs d'activité. Cette fiche traite du secteur de l'aide à la personne. L'objectif est d'aider les entreprises à mettre en place les solutions de prévention les plus pertinentes.

- **Documents non-INRS**

T. O. E. De Crom, B. Scholten, E. Traini, K. Van Der Sanden and C. Et.

Exposure to heat at work : development of a quantitative European job exposure matrix (heat JEM).

Scandinavian Journal of Work Environment and Health. 2026;52, 52:7–18, ill., bibliogr.

<https://doi.org/10.5271/sjweh.4243>

Les auteurs de cet article présentent le développement d'une matrice emploi-exposition européenne quantitative dédiée à l'exposition professionnelle à la chaleur (heat-JEM), conçue pour soutenir la recherche épidémiologique et éclairer les politiques de prévention face à l'augmentation du stress thermique liée au changement climatique. La heat-JEM estime, pour chaque profession, région et année, le nombre annuel d'heures de travail en situation de stress thermique en Europe entre 1970 et 2024, à partir d'une approche harmonisée fondée sur les normes ISO. Le stress thermique est défini lorsque la température effective dépasse une valeur de référence tenant compte du métabolisme et de l'acclimatation. La méthode combine des données météorologiques horaires à haute résolution avec des paramètres spécifiques aux emplois (activité physique, port de vêtements de travail, travail en intérieur ou en extérieur, sources locales de chaleur ou de refroidissement et organisation du travail). Les résultats montrent une exposition particulièrement élevée dans les métiers physiquement exigeants et ceux impliquant des sources de chaleur locales, notamment lorsque le port de vêtements est obligatoire, ainsi qu'une charge plus importante dans le sud de l'Europe. Contrairement aux matrices emploi-exposition classiques, la heat-JEM intègre explicitement la variabilité spatio-temporelle et fournit un outil homogène et évolutif, implémenté sous forme d'algorithme, permettant des mises à jour et des adaptations à d'autres contextes géographiques ou périodes. Cette matrice constitue ainsi un outil structurant pour l'évaluation de l'exposition professionnelle à la chaleur et l'étude de ses effets sanitaires à long terme.

EPI, matériaux protecteurs/refroidissants

M. W. Zhu, X. H. Zheng, X. S. Chen, S. R. Tan, Z. Zhao and J. H. Wu.

Finite element simulation of the tensile properties of five-layer weft-knit spacer fabrics and investigation of insulation performance.

JOURNAL OF THE TEXTILE INSTITUTE. 2026.

<https://doi.org/10.1080/00405000.2026.2726584>

Multilayer knitted fabrics are increasingly demanded in thermal protective clothing. However, achieving optimal balance between mechanical integrity and thermal insulation remains challenging. This study developed a five-layer weft-knitted fabric and evaluated its mechanical and thermal properties. A unit cell model was constructed in Rhino based on structural parameters and replicated to form the complete fabric architecture. Tensile behavior was simulated in ABAQUS under prescribed boundary conditions and displacement loads. Experimental tensile tests corroborated the numerical model, showing less than 8% error. Thermal insulation performance was assessed via active heating using embroidered conductive silver yarns under applied voltages of 10.0, 12.0, and 15.5 V. Steady-state thermal resistance tests were further carried out, and thermal resistance data of three-layer and five-layer fabrics were compared after thickness normalization. After normalization, the unit thickness thermal resistance of five-layer fabric was 6.20% higher than that of the three-layer counterpart. Infrared thermography revealed that the five-layer fabric exhibited more uniform temperature distribution and significantly delayed cooling compared to a three-layer control, demonstrating superior thermal insulation and enhanced structural stability.

J. Jia, Z. Y. Li, J. Wang, X. Y. Jia, H. W. Liu and J. H. Cheng.

Performance evaluation of fan-driven air ventilation garments for personal cooling using a coupled human thermoregulation-heat and moisture transport model.

ENERGY AND BUILDINGS. 2026;370.

<https://doi.org/10.1016/j.enbuild.2026.118095>

Fan-driven air ventilation garments (AVGs) provide energy-efficient personal cooling by continuously ventilating the clothing microclimate. Despite these advantages, existing evaluation and modeling approaches often fail to capture the dynamic physiological-physical interactions governing their cooling performance, thereby limiting reliable prediction and design optimization. To address this gap, this study develops a fully coupled mathematical framework that integrates human thermoregulation with transient heat and moisture transport across the garment system. The framework incorporates the wearer's thermoregulatory responses to thermal stimuli, ventilation-enhanced microclimate convection, and heat and moisture transport within the textile fabric layer. The resulting model was validated against thermal manikin tests, human wear trials, and literature data, demonstrating good agreement with measured segmental heat losses, skin temperature responses, and core temperature responses. Simulations further showed that optimizing airflow outlet configuration and fan flow rate improved torso cooling. With a collar-opening design, the mean torso temperature decreased by 2.3 degrees C relative to the control, while torso heat loss increased by 87%, 106%, and 119% at fan flow rates of 10, 15, and 20 L/s, respectively. Under sustained heat exposure, AVG operation provided physiological benefit by mitigating core temperature rise. In a representative intermittent-work scenario, the AVG extended allowable work duration from 25 to 30 min and reduced recovery time from 73 to 37 min, yielding a 58-min increase in cumulative work time over 6 h. Overall, the proposed

framework and simulation results provide a useful basis for the performance characterization, rational design, and further development of AVGs.

X. Ge, N. N. Niu, Y. Su, S. Y. Liu and J. Li.

Thermal management strategies for thermal protective clothing containing phase change material (PCM): A focus on heat storage and release.

INTERNATIONAL COMMUNICATIONS IN HEAT AND MASS TRANSFER. 2026;179.

<https://doi.org/10.1016/j.icheatmasstransfer.2026.112386>

Phase change materials (PCMs), owing to the heat storage properties, are widely used in thermal protective clothing to reduce thermal hazards suffered by firefighters. However, heat release from PCM fabric systems may cause secondary thermal injuries. In this study, PCM microcapsules with phase change temperatures of 25 degrees C and 42 degrees C were selected to prepare PCM thermal protective fabric systems. The thermal response of PCM thermal protective fabric systems was tested under low heat flux radiant heat conditions, and the heat storage behavior during the heat exposure phase and heat storage release characteristics during the cooling phase were quantified. The mechanisms by which PCM content, phase change temperature, and air layer thickness affect the two-stage thermal behavior were systematically analyzed. Results indicated that PCM incorporation extended the second-degree burn time by up to 15.3 s and lowered the peak skin surface temperature by 4.51 degrees C compared with the fabric system without PCM. As the PCM content increased, PCMs became the primary contributor to the total heat accumulation of the fabric system. During the cooling phase, the heat storage release efficiency of the PCM fabric system was lower than that of the fabric system without PCM, and it further decreased from 62.4-79.7% to 42.5-54.9% after the air layer was introduced. The synergistic interaction between PCMs and the air layer effectively delayed heat transfer and reduced the risk of secondary skin burns. These findings provide a quantitative foundation for the design of PCM thermal protective clothing with improved bidirectional thermal regulation.

V. Kumar, J. Acharya and D. Bhanja.

Thermal Protective Performance of Firefighter Clothing: A Review of Advances in Heat, Moisture, Materials, and Physiological Safety.

FIRE TECHNOLOGY. 2026;62(6).

<https://doi.org/10.1007/s10694-026-01976-2>

Firefighters routinely operate in extreme thermal environments where exposure to radiant heat, flames, and flash fires can degrade the protective performance of firefighter protective clothing. The effectiveness of these garments depends on key properties such as thermal insulation, reflectivity, porosity, and moisture management. While thermal insulation limits heat transfer to the skin, moisture accumulation from perspiration or environmental humidity can enhance heat and mass transfer within the clothing system. Moisture evaporation and condensation further exacerbate thermal stress, increasing the likelihood of burn injuries. This review critically examines the thermal protective performance of firefighter garments under high-temperature and moisture-rich conditions. It synthesizes current knowledge on coupled heat and moisture transport, fabric architecture, air-gap effects, material properties, and multilayer garment configurations. Advances in experimental characterization, numerical modeling, and predictive assessment of thermal degradation are also evaluated. Finally, key research gaps and future directions are highlighted to improve garment aging

assessment, damage quantification, and service-life prediction, thereby supporting the development of safer, more durable, and high-performance firefighter protective systems.

Y. Tang, Z. H. Ren, K. Huang, S. Zhang and J. L. Liu.

Weft-Backed Cooling Fabric for Personal Thermal and Moisture Management.

ACS APPLIED MATERIALS & INTERFACES. 2026.

<https://doi.org/10.1021/acsami.6c12312>

During intense physical activity or exposure to solar radiation in hot and humid environments, heat continuously accumulates at the body surface and induces excessive sweating, thereby increasing the risks of dehydration, heat exhaustion, and even heat stroke, which severely compromise human thermal and moisture comfort. Consequently, textiles with integrated heat and moisture management capabilities have attracted considerable attention. However, many reported materials still rely on electrospinning, multilayer membrane assembly, or complex postfunctionalization, which may limit scalable fabrication and single-textile integration. Herein, a PET/PLA Hybrid Weft-Backed Moisture-Cooling Fabric (HCF) was developed for personal thermal and moisture management. The fabric consists of an inner PET layer treated with a superhydrophobic (PDMS) coating, a moisture-transport middle layer composed of PET/PLA hybrid yarns, and an outer hydrophilic PLA/PLA layer spray-coated with highly scattering Al₂O₃ nanoparticles (NPs). Through a cost-effective weaving strategy, directional moisture transport and radiative cooling were effectively integrated into the fabric structure. The HCF exhibits a one-way moisture transport index (R) of 614%, while reverse water penetration is effectively suppressed, with an R value of -606%. The moisture evaporation rate reaches 0.25 g & centerdot;h⁻¹. In addition, the HCF demonstrates a solar reflectance (0.3-2.5 μm) of 90.80% and a mid-infrared emissivity (7-14 μm) of 92.46%. Under sunny outdoor conditions, HCF achieved an average subambient cooling of 10.4 degrees C relative to ambient air and was more than 5 degrees C cooler than conventional cotton fabric, indicating its potential to provide a cooler and drier skin-side microenvironment. This work offers a promising strategy for the design and application of advanced functional textiles, facilitating improved human adaptability to complex and dynamic environments.

Outils et capteurs de mesure

H. Kim, C. Hwang and D. Y. Kim.

Deep-learning-based approach for accurate and rapid estimation of core body temperature using a single heat flux sensor.

RESULTS IN ENGINEERING. 2026;32.

<https://doi.org/10.1016/j.rineng.2026.112236>

Accurate and rapid prediction of core body temperature (CBT) is essential for monitoring physiological homeostasis, enabling early detection of fever, thermal stress, and circulatory dysfunction. Wearable CBT sensors were required to provide reliable measurements under diverse environmental conditions to support continuous health monitoring and clinical decision-making. However, real-time CBT prediction without prolonged thermal stabilization and while maintaining robustness against environmental interferences remained a significant challenge. This paper introduced a concentric cylindrical single heat-flux sensor integrated with a deep-learning framework that was trained on a large dataset including finite-element simulation results and experimentally validated transient thermal responses. A developed deep learning model that learned conduction- and convection-governed features from only the initial 30 s of temperature signals achieved a mean absolute error below 0.1 degrees C across various boundary conditions at ambient temperature (5-35 degrees C), convective heat transfer coefficients (0-50 W ⋅m-2 ⋅K-1), skin thermal conductivity (0.32-0.50 W ⋅m-1 ⋅K-1) and sensor thickness (1-5 mm). The framework demonstrated rapid convergence, sustained accuracy under airflow perturbations, as well as reliable tracking during 75 min of stepwise CBT variations. Validation with skin-mimicking phantoms further confirmed robustness of the developed model across environmental and physiological conditions. The proposed approach collectively enabled noninvasive and site-independent real-time CBT monitoring and provided strong potential for continuous health surveillance, early fever diagnosis, and thermal stress assessment.

X. L. Wu, X. W. Xuan, M. J. Li and H. J. Li.

Wearable and machine learning-assisted RFID antenna sensor with PEDOT:PSS/graphene film for body temperature measurement.

SENSORS AND ACTUATORS A-PHYSICAL. 2026;406.

<https://doi.org/10.1016/j.sna.2026.117879>

This paper presents a wearable UHF RFID temperature sensor enabled by a PEDOT:PSS/graphene composite film. Leveraging the synergistic effect between graphene's high thermal conductivity and PEDOT:PSS's negative temperature coefficient (NTC), the sensor achieves a high sensitivity of 1.568 dBm/degrees C over the physiologically relevant range of 35-42 degrees C, with an ultrathin film thickness of just 110 nm. The temperature-sensitive film, spincoated onto the antenna, modulates the input impedance and thereby converts the received signal strength indicator (RSSI) into body temperature readings. To address the nonlinear RSSI-temperature relationship caused by individual tissue variations, an XGBoost-based calibration model was developed using data from 50 subjects. After calibration, the sensor achieves a mean absolute error of 0.437 degrees C on an unseen test set, outperforming recently reported epidermal RFID tags. Compared to commercial infrared thermometers, our sensor offers the advantages of continuous, wireless, and passive operation with comparable accuracy, demonstrating strong potential for long-term, non-invasive health monitoring.

Travail par fortes chaleurs et périodes de canicule

S. Ananian, S. Suarez Dillon Soares and T. Karimova.

Climate-related heat stress and occupational mortality in Colombia.

In: D. International Labour Organization. Research, editor. Geneva: ILO; 2026.

<https://doi.org/10.54394/00034736>

Using death certificate data recorded in the Colombian vital statistics system for 2017–2021, together with temperature data from meteorological stations, this study examines mortality associated with air temperatures above 26°C across occupations classified at the 2-digit level of the International Standard Classification of Occupations (ISCO-08). The findings highlight that agricultural workers, assemblers, and health and teaching professionals face the highest mortality risk associated with exposure to high temperature in Colombia. Overall, male workers are more affected by the consequences of high temperatures. However, women appear to be particularly vulnerable in occupations such as health associate professionals, where they account for a large majority of workers. Preventive measures, including risk assessment, should therefore be reinforced, especially for these occupations in the context of global climate warming. Regarding remediation, the coverage of common health insurance has expanded significantly in recent decades and now reaches almost 99 per cent of the entire population, but only around half of the working population is covered by social protection schemes for occupational risks.

D. C. Moore, S. R. Notley, B. Aisbett, J. Lum and L. C. Main.

Cognitive Performance in Young Adults During Three Consecutive Days of Simulated Occupational Heat Stress: An Exploratory Study.

AMERICAN JOURNAL OF INDUSTRIAL MEDICINE. 2026.

<https://doi.org/10.1002/ajim.70123>

Introduction: Global increases in occupational heat exposure are raising concerns about worker safety and cognitive performance during prolonged and repeated shifts. At present, the cumulative effects of repeated heat exposure on cognitive performance remain unclear. This exploratory study examined cognitive performance and perceived workload across three consecutive days of simulated occupational heat stress. Methods: Twenty physically active adults (age: 27 +/- 6 years [5 female]) completed two randomized crossover trials comprising three consecutive 8-h workdays under hot (35 degrees C; 63% RH; WBGT 31 degrees C) and control (18 degrees C; 53% RH; WBGT 14 degrees C) conditions wearing minimal clothing (< 1 Clo). Participants performed moderate-intensity physical work (similar to 4.3 METs) using a 30-min work:30-min rest schedule. Cognitive performance was assessed at start-of-day, midday, and end-of-day using the Joggle Research battery, evaluating sensorimotor speed, processing speed, and attention, visuospatial perception, sustained attention, and visual memory. Perceived workload was assessed at start-of-day and end-of-day using the NASA Task Load Index. Results: Cognitive performance was largely preserved across domains within and across repeated workdays, with no evidence of cumulative impairment ($p \geq 0.170$). Unexpectedly, sustained attention improved in the heat. Perceived physical workload was higher in the heat, while perceived mental workload was unchanged. Conclusions: Under prescribed work-rest conditions, cognitive performance appears to be maintained across consecutive days of occupational heat exposure in young, physically active adults. Future work should explore the relationship between heat and cognition in larger, more diverse work populations and in more challenging conditions.

H. H. Yu, S. Yang, S. Liu, L. F. Jiang, C. Zhong and J. Q. Wang.

The danger of feeling fine: Objective-subjective thermal mismatch in delivery workers under urban heat extremes.

SUSTAINABLE CITIES AND SOCIETY. 2026;149.

<https://doi.org/10.1016/j.scs.2026.107800>

Global warming is increasing the frequency and intensity of extreme heat events, posing growing health risks to outdoor workers. Among outdoor occupations, delivery workers constitute a rapidly expanding and particularly vulnerable workforce. Delivery workers face acute heat stress driven by high mobility and time-constrained work patterns. However, field-based evidence linking their physiological strain to environmental exposure remains scarce. To bridge this gap, we developed a synchronized field-monitoring framework to evaluate the relationships among environmental exposure, physiological strain, and subjective thermal response. During three midday heatwave days, we conducted field observations on 15 delivery riders and obtained 316 valid ear canal temperature records with subjective responses. Thermal exposure was assessed using multiple thermal and biometeorological indices. The results showed that workers were subjected to persistent moderate-to-severe heat stress, with environmental parameters consistently reaching hazardous levels. Physiological monitoring revealed clear heat strain, with 15.5% of ear canal temperature records exceeding the risk-screening threshold. Importantly, the study suggests an objective-subjective mismatch: a large proportion of subjective comfort responses remained "acceptable" despite objectively hazardous environmental and physiological indicators. This mismatch suggests that subjective self-assessment alone may be insufficient for identifying elevated heat-health risk among delivery riders, underscoring the need for targeted occupational heat-health interventions and broader protection of platform-based outdoor labor under intensifying urban climate extremes.

G. Bourgois, K. T. Janetos, F. K. O'Connor, L. G. Ioannou and G. P. Kenny.

Limited Agreement Between Perceptual and Physiological Heat Strain at Initial Stay Times for Continuous Work in the Heat Before Heat Alleviation Controls.

AMERICAN JOURNAL OF INDUSTRIAL MEDICINE. 2026.

<https://doi.org/10.1002/ajim.70127>

Introduction Accurate assessment of heat strain at initial stay time (IST; core temperature 38.0 degrees C or Delta 1.0 degrees C above resting), when heat mitigation decisions are required, is critical for managing occupational heat exposure. We evaluated the relationship and agreement between physiological (Physiological Strain Index [PSI] and adaptive PSI [aPSI]) and perceptual (Perceptual Strain Index [PeSI]) indices during simulated occupational work performed until IST. Methods Ninety-seven healthy adults completed treadmill walking to IST at either moderate-intensity (200 W & centerdot;m(-2); 24 young [12 females] and 25 older adults [13 females]) or heavy-intensity (260 W & centerdot;m(-2); 24 young [12 females] and 24 older adults [12 females]) at wet-bulb globe temperatures (WBGT) of 26 degrees C, 29 degrees C, or 32 degrees C. Core and skin temperatures, heart rate, thermal sensation, and ratings of perceived exertion were measured to calculate PSI, aPSI, and PeSI. Relationships between indices were assessed using linear mixed-effects models, and agreement was evaluated using Bland-Altman analyses. Results PeSI increased with PSI and aPSI during moderate- and heavy-intensity work (all $p < 0.01$). These relationships were not modified by group, environmental condition, body surface area, or aerobic fitness. However, agreement between perceptual and physiological indices was limited, showing wide limits of agreement between PSI and PeSI during moderate- (-2.3 to 4.2 AU) and heavy-intensity (-3.0 to 4.0 AU) work. The agreement between PeSI and aPSI was modestly improved

but remained variable. Conclusion We show that although perceptual responses increase with physiological heat strain, they do not reliably reflect physiological burden at IST, when decisions regarding the implementation of heat mitigation strategies are required.

A. R. Tamim, M. M. Patwary, M. Bardhan, M. I. A. Badhon, M. S. Rahman, I. C. Sakib, A. Iftikhar, M. P. Kabir, M. N. S. Pitol, C. Saha and M. Browning.

Occupational heat risk perceptions and behavioral adaptation strategies among construction and welding workers in Bangladesh.

SCIENTIFIC REPORTS. 2026;16(1).

<https://doi.org/10.1038/s41598-026-53118-x>

The increasing frequency and intensity of extreme heat events pose severe health risks to outdoor workers. Despite growing global recognition of occupational heat illness, evidence from low- and middle-income countries (LMICs) remains limited. This cross-sectional study surveyed 320 construction and welding workers to assess perceived heat-related health risk and behavioral adaptation in Bangladesh. Multinomial logistic regression examined factors associated with adaptive behaviors. Over 80% of workers perceived themselves as vulnerable, commonly reporting excessive sweating, thirst, cramps, irritability, and emotional instability. Construction workers were more likely to increase adaptive behaviors such as taking regular breaks (OR = 9.49, 95%CI: 2.45-36.74), wearing loose clothing (OR = 4.26, 95%CI: 1.14-15.90), and using electric fans (OR = 2.84, 95%CI: 1.12-7.22). However, they were also more likely to report a decrease in slowing their work pace (OR = 14.20, 95%CI: 2.03-99.21) and in planning work during cooler hours (OR = 34.81, 95%CI: 2.22-546.80). Long work experience was associated with increased use of electric fans as a cooling option (OR = 6.97, 95%CI: 1.97-24.68) and greater attention to weather forecasts (OR = 3.81, 95%CI: 1.01-14.37). Workers who experienced burns or memory decline adopted specific protective measures. Surprisingly, higher education was linked to lower participation in heat-safety training. These findings highlight the urgent need for occupational heat-safety policies, awareness campaigns, and targeted interventions to safeguard vulnerable outdoor workers in Bangladesh.

J. W. Lee.

Thermal captives on campus: a mixed-methods assessment of maintenance workers' heat exposure and building climate resilience during a severe heatwave.

ENERGY AND BUILDINGS. 2026;370.

<https://doi.org/10.1016/j.enbuild.2026.118104>

The adaptive comfort model assumes occupants can act on discomfort. We examined a population for whom it fails: campus maintenance workers without HVAC control, unable to relocate, in mandated uniforms, and working at 2.0-4.5 met, beyond the model's validated range. During a July 2025 heatwave in Daegu, South Korea (outdoor maximum 37.4 degrees C), we monitored thermal conditions in 23 buildings with a 52-sensor IoT network (740,804 data points) and surveyed and interviewed the 30 workers assigned to them. K-means clustering identified three building thermal types (pairwise Adjusted Rand Index 0.86-1.00). Indoor temperatures ranged from 25.5 to 31.9 degrees C, and 74% of buildings exceeded the CIBSE TM52 overheating threshold. Hourly indoor-outdoor regression yielded mean $R^2 = 0.020$: indoor temperature was largely decoupled from concurrent outdoor temperature, consistent with thermal mass retention rather than contemporaneous transmission. Minimum indoor temperatures remained above 28 degrees C in 8 of 13 hottest-cluster buildings, leaving no period of thermal relief in the monitored zones. The Griffiths neutral temperature (27.2 degrees C) was only 0.7

degrees C above the ASHRAE prediction, yet 22 of 30 workers (73%) claimed habituation while describing symptoms. Heat-stress symptoms followed the building thermal gradient (fatigue: 69% in the hottest cluster, 25% in the coolest), while humidity-related symptoms showed the reverse pattern. We term this structural denial of adaptive opportunity thermal captivity. For such populations, sensation-scale neutrality may not indicate physiological wellbeing, and standards relying on it alone may underestimate occupational heat risk. A vulnerability matrix identifies priority buildings where retrofit addressing heat retention may reduce this risk.

J. Zhang, C. Y. Liu, H. Yang, H. B. Liu, S. Wang, G. Y. Huang, W. Z. Lu and K. L. Feng.

Working efficiency and cognitive load impacts by factory-like construction working environments in hot summer: evidence from rebar tying workers.

ENGINEERING CONSTRUCTION AND ARCHITECTURAL MANAGEMENT. 2026.

<https://doi.org/10.1108/ECAM-11-2025-1887>

Purpose In the construction sector, adverse working environments are often considered an important factor influencing accident occurrence and productivity. Although factory-like platforms such as the aerial building machine (ABM) have been introduced to improve on-site conditions, their effects on workers' efficiency and cognitive load remain unclear. Given that such platforms reshape hot summer environments, clarifying their effects on workers is essential to guide evidence-based design and management strategies for improving safety and productivity under heat stress. Therefore, this study examines the impacts of micro-environments created by factory-like construction platforms on workers' extraneous cognitive load and work efficiency, aiming to support sustainable improvements in construction working environments. *Design/methodology/approach* This study combines field and laboratory investigations to evaluate differences in workers' environment-induced extraneous cognitive load and work efficiency with and without factory-like construction platforms. The National Aeronautics and Space Administration Task Load Index (NASA-TLX) assesses subjective cognitive workload, while task performance indicators provide a comprehensive evaluation of workers' responses. *Findings* The results reveal that factory-like construction platforms, such as the ABM, positively influence rebar workers' performance and extraneous cognitive load by providing favorable temperature, solar radiation and brightness in summer, although they have some adverse effects on humidity and wind speed. *Originality/value* This study provides empirical evidence on how ABM-modified environments affect workers' extraneous cognitive load and work efficiency. This evidence advances understanding of environmental influences in construction and supports the development of improved construction working environments. Additionally, it offers guidance for the design of factory-like construction platforms or aerial building machines.

Travail dans une ambiance thermique extrême

J. S. Wu, C. Xu, Z. C. Zhao, C. Li, Z. X. Tao and Y. J. Zhang.

Experimental study on thermal physiology and perception of rescue personnel in extremely high-temperature environments.

INTERNATIONAL JOURNAL OF INDUSTRIAL ERGONOMICS. 2026;115.

<https://doi.org/10.1016/j.ergon.2026.104031>

When emergency rescuers perform heavy physical tasks in extreme heat, their protective rescue clothing restricts heat dissipation, often leading to severe heat strain. This study evaluated the physical workload and thermal strain of rescuers wearing standard emergency suits. Participants completed a simulated intermittent rescue protocol under different high-temperature conditions (36, 38, and 40 degrees C). The results showed delayed heat dissipation during recovery. Specifically, core temperature continued to rise even during the rest periods following strenuous work, indicating that short rest periods may be insufficient to dissipate accumulated body heat. We also found that transient decreases in skin temperature did not correspond to reductions in core temperature. Additionally, the subjective Rate of Perceived Exertion (RPE) showed a strong association ($R^2 = 0.91$) with the objective decline in grip strength, suggesting that RPE may serve as a practical supplementary indicator of fatigue-related functional decline during field operations. Overall, these findings highlight the need to optimize work-rest schedules for rescue operations. To better protect emergency rescuers, our results suggest that safety protocols could benefit from incorporating active cooling measures, rather than relying solely on passive rest.

Webinaire(s)

[Impacts des changements climatiques sur la SST](http://Centrepatronalsst.qc.ca). Centrepatronalsst.qc.ca, conférence le mardi 6 octobre 2026

Les changements climatiques modifient progressivement les conditions de travail et font émerger de nouveaux enjeux en santé et en sécurité du travail. Les chaleurs extrêmes, le smog, les événements météorologiques intenses et les nouveaux risques biologiques exposent les travailleurs à des réalités de plus en plus complexes. Développée par l'[IR SST](#), cette conférence d'une durée d'une heure (45 minutes de présentation suivies de 15 minutes de questions) propose un éclairage sur ces impacts et des pistes concrètes de prévention pour mieux adapter les milieux de travail.

Actualités août 2026

• Travail par fortes chaleurs et périodes de canicule

[Comment les fortes chaleurs pèsent sur les chantiers routiers.](#) Ladepeche.fr, 1er août 2026

[« Il va falloir changer pour ne pas disparaître » : à cause de la chaleur de l'été, ce patron brestois n'a pas pu accueillir ses salariés dans ses locaux.](#) Letelegramme.fr, 6 août 2026

[Canicule à Nice : obligés de travailler sous la chaleur, les livreurs dénoncent l'hypocrisie des plateformes Uber Eats et Deliveroo.](#) Nicematin.com, 9 août 2026

[Canicule, grève perlée : au CHU de Nantes, les conditions de travail « restent exécrables », estiment les syndicats.](#) Lefigaro.fr, 11 août 2026

[À Morlaix, la salle de vente d'Emmaüs fermée ce mercredi 12 août.](#) Letelegramme.fr, 11 août 2026

[« Seules une vraie coupure et une récupération effective permettent de revenir au travail dans de bonnes conditions d'efficacité » : canicule et hyperconnexion, un cocktail explosif pour les salariés.](#) Lesechos.fr, 12 août 2026

[Canicule : les bus surchauffés dans le viseur de l'inspection du travail.](#) Leprogres.fr, 13 août 2026

[Sur le chantier du tram à Caen, les travailleurs s'adaptent à la chaleur.](#) Ouest-france.fr, 14 août 2026

[Chaleur et odeurs nauséabondes : les éboueurs de l'agglomération de Pau collectent en horaires décalés.](#) Ici.fr, 17 août 2026

[« Le principal risque au travail reste la chaleur ».](#) Humanite.fr, 20 août 2026

[Un logis du XVe siècle pour s'abriter lors des pics.](#) L'Écho Républicain (presse, p. 14), 21 août 2026

[Congé climatique, chômage pour force majeure: comment le monde du travail s'adapte aux fortes chaleurs.](#) Levif.be, 31 août 2026

[As France's Elders Swelter in the Heat, Postal Workers Come to the Rescue.](#) Nytimes.com, 3 août 2026

[Longer lunches, more breaks as Korea's workplaces battle heat.](#) Koreaherald.com, 6 août 2026

[High temperatures linked to increased mortality among workers in Colombia, ILO study finds.](#) Ilo.org, 18 août 2026

[Warm and refreshing care touches people's hearts; Yangpu Trade Union safeguards frontline workers through the summer.](#) Shyp.gov.cn, 24 août 2026

• Maladies liées à la chaleur

[Retards, crampes, règles en continu... Pourquoi les fortes chaleurs dérèglent le cycle menstruel.](#) Marieclaire.fr, 2 août 2026

[Indian laborer who worked through 104-degree heat, collapsed at home, and joined a hidden death toll.](#) Thecooldown.com, 2 août 2026

[Heat leaves women platform workers in Delhi-NCR grappling with health issues: Report.](#) Timesofindia.indiatimes.com, 8 août 2026

[« On fait des malaises à cause de la chaleur » : la RATP épinglée par l'inspection du travail à cause des bus surchauffés.](#) Leparisien.fr, 9 août 2026

[Heatwaves causing nurses to have seizures as ward temperatures top 30C.](#) Independent.co.uk, 13 août 2026

[Vague de chaleur : pourquoi le corps s'épuise](#). Ledauphine.com, 20 août 2026

- **EPI, matériaux protecteurs/refroidissants**

[Ulsan's factories fight the summer swelter with ice machines, cooling vests and chilled fruit punch](#).
Koreajoongangdaily.com, 3 août 2026

[UAE summer: 5,000 health kits for Dubai delivery riders with cooling towels, hand fans](#).
Khaleejtimes.com, 7 août 2026

[Emergency service women to trial fire-resistant period undies and bras](#). Abc.net.au, 24 août 2026

[Face à la chaleur, les salariés japonais se réfugient dans des réfrigérateurs spéciaux](#). Cnews.fr,
25 août 2026

[RefrigiWear® Debuts Seven New Women's PPE Styles at NAATSHO Conference](#). Refrigiwear.com,
31 août 2026