Міністерство освіти і науки України
Харківський національний економічний університет
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III ВСЕУКРАЇНСЬКА НАУКОВО-ПРАКТИЧНА КОНФЕРЕНЦІЯ

«ФІЗИЧНЕ ВИХОВАННЯ, БЕЗПЕКА ЖИТТЄДІЯЛЬНОСТІ

І СУЧАСНІ ТЕХНОЛОГІЇ ВИРОБНИЦТВА»

12 березня 2026 року

Збірник наукових праць

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м. Харків, 12 березня 2026 року

Харків
2026

UDC 331.442:004

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TECHNOSTRESS AND DIGITAL OVERLOAD AS EMERGING CHALLENGES FOR MENTAL WORK HYGIENE

The Digital Paradigm Shift and the Emergence of Technostress. The contemporary labour environment has undergone a seismic and fundamental paradigm shift, driven by the exponential acceleration of digitalisation and the ubiquitous integration of Information and Communication Technologies (ICTs) into every facet of professional life. This transition marks the dawn of the Industry 4.0 era, where the boundaries of the physical workplace have dissolved. While it is undeniable that the strategic deployment of ICTs has radically optimised operational efficiency, streamlined global communication, and afforded the workforce an unprecedented degree of flexibility – most notably through the widespread adoption of remote and hybrid work model – it has simultaneously given rise to a critical and pervasive occupational hazard known as technostress.

From the perspectives of human security and occupational health, it is imperative to recognise that the digital sphere cannot be viewed merely as a passive instrument or a set of auxiliary tools for task execution. Instead, it has evolved into the dominant environment for the modern worker. This digital ecosystem now exerts a direct, profound, and often unmitigated impact on the psychological and physiological integrity of the workforce, superseding physical workplace conditions as the primary determinant of employee well-being.

Recent empirical studies indicate that this new reality has precipitated a state of chronic digital overload [1; 2]. The «always-on» workplace culture has systematically eroded the traditional temporal and spatial boundaries between professional duties and personal life, creating a phenomenon of «boundarylessness» in which employees are perpetually accessible. The modern workforce is thus subjected to a relentless stream of information, leading to cognitive saturation. Research confirms that the compulsion to process vast quantities of data and the societal pressure to respond instantaneously to digital stimuli are strongly correlated with elevated rates of severe burnout, generalised anxiety, and a marked decline in overall job satisfaction.

Furthermore, the rapid and often involuntary shift to remote working arrangements has introduced novel psychosocial stressors. The phenomenon of «Zoom fatigue» – a unique form of exhaustion caused by the intense cognitive demand of interpreting non-verbal cues via video conferencing and the stress of constant self-viewing – has become prevalent. Combined with the loss of informal office interactions, this has highlighted social isolation as a significant emerging occupational risk. Consequently, the digital environment is no longer just a neutral medium; it has

become the defining factor of modern occupational health, necessitating a complete re-evaluation of safety protocols to protect the workforce [3].

Defining the Threat: Mechanisms of Digital Overload. To address safety issues appropriately within the modern organisational framework, it is essential to move beyond surface-level definitions and understand the complex nature of the threat. Technostress is currently conceptualised as far more than simply technophobia or a lack of digital literacy; it is defined as a modern disease of adaptation. It stems from the fundamental mismatch between the rapid pace of technological evolution and the human biological capacity to adapt to these new demands in a healthy way. In the contemporary workplace, this maladaptation manifests primarily through three distinct, yet interconnected, mechanisms that systematically deplete employees' cognitive resources.

Firstly, information overload (often referred to as «infobesity») is the phenomenon in which the sheer volume and velocity of incoming data exceed the individual's processing capacity. The human brain has a finite limit for cognitive load. When this «bandwidth» is saturated by a constant barrage of emails, instant messages, and data points, the brain struggles to filter relevant from irrelevant stimuli. Consequently, decision-making capacity is severely impaired, leading to «analysis paralysis». Research indicates that when cognitive limits are exceeded, the brain resorts to heuristics, which drastically increase the risk of operational error and degrade judgment quality [4].

Secondly, the digital environment actively encourages multitasking, promoting the illusion that handling multiple data streams simultaneously increases productivity. However, neuroscience confirms that true multitasking is a myth; the process is scientifically understood as «rapid task-switching». This constant shifting of focus incurs a significant «switching cost» – a metabolic expense that drains glucose from the brain. Furthermore, this leads to a phenomenon known as «attention residue», in which a portion of the user's cognitive focus remains on the previous task even after moving to a new one. This fragmentation of attention results in a shallower depth of processing and a higher error rate in safety-critical tasks.

Finally, the emerging phenomenon of workplace telepressure represents a critical psychological shift. It is defined as the preoccupation with and the overwhelming urge to respond to work-related messages immediately, regardless of the time of day or location. Unlike a simple workload, telepressure is an internalised anxiety driven by digital connectivity. It directly interferes with psychological detachment – the ability to mentally «switch off» from work – which is physiologically required for recovery. Recent studies demonstrate that high levels of telepressure are a powerful predictor of chronic sleep disturbances and physical exhaustion. It occurs because the anticipation of notifications keeps the body in a perpetual state of «hyper-arousal» or «awake alertness», preventing the parasympathetic nervous system from initiating necessary restorative processes [5].

Impact on Safety and Health: From Cognitive Fatigue to Systemic Operational Risks. The consequences of unaddressed digital overload reach far

beyond mere personal discomfort or slight productivity losses. In today's Occupational Health and Safety (OHS) framework, technostress should be reconsidered not just as an individual issue but as a significant systemic risk. It undermines human reliability and establishes latent conditions for accidents through three distinct, interconnected mechanisms [6].

Cumulative Recovery Deficit and Physical Reliability. The most covert effect of the «always-on» culture is the degradation of the recovery process. Established safety models presume that an employee returns to their shift both mentally and physically rejuvenated. However, constant digital connectivity blurs the line between work and relaxation. The urge to check work chats or reply to emails during off-hours hinders psychological detachment – the mental «switching off» that allows the brain to reset. As a result, employees frequently start their workday already fatigued. It is not merely a sensation of tiredness but a measurable physical condition where reaction times slow and motor coordination declines. Research shows that interruptions to sleep from late-night digital activity cause performance deficits comparable to those of someone with a blood alcohol level of 0.05%. In sectors where safety is critical, such as transportation, construction, and energy, this «digital hangover» significantly increases the likelihood of accidents by delaying reactions to warning signals.

Cognitive Bandwidth and the «Resumption Lag». The second mechanism relates to the immediate processing of information. The human brain possesses a limited «cognitive bandwidth». As this capacity becomes overwhelmed by an incessant flow of digital information (notifications, messages, alerts), the brain struggles to recognise physical safety cues. This results in two perilous phenomena:

1. Inattentional Blindness: the worker observes a hazard (e.g., a warning light or a moving vehicle) but fails to «see» it as their cognitive resources are fully consumed by digital processing.

2. Resumption Lag: when interrupted by a digital device, a delay is required to refocus on the primary task. Research indicates that during this lag, working memory is momentarily «erased». The likelihood of missing a critical step in a safety protocol (e.g., failing to lock a valve or secure a harness) doubles immediately after a digital interruption. The error arises not from incompetence but from fragmented focus.

Erosion of Safety Culture and «Hurry Sickness». Lastly, chronic technostress fundamentally changes workplace behaviours. The urgency to respond promptly to digital communications fosters a sense of «hurry sickness» – a persistent, underlying anxiety to act more quickly. This sense of urgency often clashes with safety protocols, which naturally require time and careful consideration. Employees experiencing digital burnout – marked by emotional fatigue and cynicism – are statistically less likely to comply with safety regulations. To manage the perceived urgency, workers start to see safety checks as bureaucratic obstacles rather than essential safeguards. It leads to a normalisation of risk, where taking shortcuts becomes the accepted norm to fulfil digital demands. Therefore, technostress serves as a trigger, transforming a disciplined workforce into a delicate one, susceptible to carelessness and violations.

Mitigating Digital Risks: Strategies for Mental Work Hygiene. To effectively counter the systemic threat of technostress, organisations must move beyond ad-hoc advice and implement a structured framework for Mental Work Hygiene. Current best practices in OHS suggest that digital overload should be managed using the traditional Hierarchy of Controls, prioritising organisational changes over individual coping mechanisms.

Organisational Policy: The «Right to Disconnect». The most effective administrative control is the formalisation of the «Right to Disconnect». It does not merely imply a suggestion to avoid after-hours work but requires a binding policy that protects employees from the expectation of constant availability. Organisations must establish clear Digital Communication Charters. These documents should explicitly define:

Restricted Hours: A prohibition on sending non-emergency emails or messages between specific hours (e.g., 19:00 to 08:00) and during weekends. Technical solutions, such as configuring servers to delay the delivery of out-of-hours emails until the next working day, are highly effective engineering controls.

Definition of Urgency: A precise classification of what constitutes a genuine «emergency» requiring immediate attention versus information that can wait. It reduces the psychological state of «telepressure» – the urge to respond immediately to trivial notifications. By removing ambiguity about availability, companies can significantly lower their workforce's baseline cortisol levels, thereby restoring the capacity for physiological recovery.

Work Design: asynchronous Communication and «Deep Work». To mitigate cognitive fatigue and the «switching costs» associated with multitasking, work processes must be redesigned to favour asynchronous communication. The prevailing culture of «instant responsiveness» is the primary driver of cognitive fragmentation. Employers should encourage a shift towards batch processing of communication. Instead of reacting to messages in real time, employees should be allocated specific time blocks (e.g., 30 minutes in the morning and 30 minutes in the afternoon) solely for processing correspondence. It protects periods of «Deep Work» – sustained intervals of concentration without digital interruptions. Furthermore, the use of «Do Not Disturb» modes on corporate devices should be normalised and encouraged, rather than viewed as a sign of disengagement. Research confirms that preserving these blocks of uninterrupted time significantly reduces error rates in safety-critical tasks and improves overall job satisfaction.

Individual Training and Digital Literacy. While the primary responsibility lies with the employer, individual resilience is also a key component of safety. OHS training programmes must be updated to include modules on Digital Hygiene and Neuro-ergonomics. Key training areas should consist of:

1. Information Dieting: techniques to filter and limit the intake of non-essential data (e.g., «doomscrolling») which depletes cognitive resources needed for work tasks.

2. Blue Light Management: educating staff on the physiological impact of screen exposure on circadian rhythms. The use of blue-light filters and «dark mode» interfaces

should be standard practice to protect sleep quality, which is directly linked to alertness and safety performance.

3. Cognitive Recovery Techniques: training employees in active recovery methods, such as the 20-20-20 rule (every 20 minutes, look at something 20 feet away for 20 seconds) to reduce visual strain and mental fatigue.

Conclusion on Prevention. Ultimately, mitigating technostress requires a cultural shift. Safety leaders must champion the idea that a rested, disconnected employee is a safer and more reliable asset than one who is perpetually online. Integrating these digital hygiene standards into the company's OHS management system (such as ISO 45003) is the critical next step in ensuring human safety in modern conditions.

Conclusions. The analysis presented in this paper highlights that technostress and digital overload have evolved from minor productivity hindrances into significant occupational hazards affecting human security in modern conditions. The pervasive «always-on» culture and the unchecked flow of digital information act as stressors that deplete the cognitive resources essential for safe and effective work performance.

The research confirms a direct causal link between digital fatigue and the degradation of operational safety. The physiological impacts of chronic connectivity – specifically sleep disruption and the suppression of recovery mechanisms – combined with the cognitive phenomena of «tunneling» and «resumption lag», drastically increase the probability of human error. In high-risk industries, an operator suffering from digital burnout poses a safety risk comparable to one under the influence of fatigue or substance impairment.

Consequently, ensuring human safety in the digital era requires a paradigm shift in OHS management. It is imperative to move beyond the traditional focus on physical risks and fully integrate Psychosocial Risk Management into core safety protocols. It includes formalising the «Right to Disconnect», redesigning communication workflows to support «deep work», and implementing neuro-ergonomic principles.

Ultimately, protecting the worker's mental health is no longer a peripheral concern but a fundamental requirement for sustainable development. A robust safety culture in the 21st century must recognise that a rested, cognitively intact employee is the most critical safeguard against accidents and systemic failures.

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