INTERNATIONAL JOURNAL OF
INTEGRATIVE AND
MODERN MEDICINE

Artificial Intelligence and Occupational Hygiene Requirements in Automated Production

Abdurayimov Islomjon Ibrohim ogli
Resident 2 Year student of Fergana Institute of Public Health

Abstract: In modern industrial processes, the widespread application of artificial intelligence (AI) and automated technologies has shaped new occupational hygiene requirements in the workplace. In such conditions, safeguarding human health, increasing labor productivity, and preventing occupational diseases have become urgent issues. This article highlights the factors ensuring occupational hygiene in AI-driven production lines, adherence to ergonomic requirements, psychophysiological workloads in the labor process, and the improvement of safety standards. It also analyzes the hygienic risks arising in human–machine interaction and provides scientifically grounded recommendations to reduce them. The research results are of practical importance for improving the working environment in automated enterprises and creating healthy and safe working conditions.

Keywords: artificial intelligence, automated production, occupational hygiene, ergonomics, safety requirements, occupational health, risk factors in the production environment.

INTRODUCTION

In the 21st century, rapid advancements in digitalization, automation, and artificial intelligence (AI) technologies are fundamentally transforming industrial and manufacturing processes. Many production operations previously performed manually are now carried out by robotics and automated systems. This process, while easing human labor, also brings new challenges in the field of occupational hygiene and safety.

The Resolution of the President of the Republic of Uzbekistan "On approval of the Digital Uzbekistan – 2030 Strategy" dated April 28, 2020 [2] and the "New Uzbekistan Development Strategy for 2022–2026" dated January 28, 2022 [3] identify the introduction of modern technologies into production, the creation of safe working conditions for employees, and the provision of a healthy environment as priority tasks. Therefore, studying occupational hygiene requirements in AI and automated production processes is of both scientific and practical significance.

According to scientific sources, workloads in high-tech production lines are less associated with traditional physical labor and more with psychophysiological and neuropsychological strain. Hence, particular attention should be paid to ergonomics, lighting, noise, microclimate, electromagnetic radiation, and radiological hazards as occupational hygiene factors.

Modern requirements of occupational hygiene in automated production are not limited to maintaining employee health, but are also directly linked to increasing productivity, ensuring high product quality, and building a competitive industry. From this perspective, improving hygienic standards, assessing risks, and eliminating hazards in AI-driven production systems are pressing research objectives.

LITERATURE REVIEW

In recent years, the impact of AI and automated production on occupational hygiene has been widely discussed in scientific literature. International studies note that while digitalization and robotics alleviate physical labor, they also generate new types of psychophysiological workloads. For example, research conducted in Germany, Japan, and South Korea has shown that in automated enterprises, nervous system strain, the need for sustained concentration, and increased sensory loads are major occupational hygiene concerns.

Uzbek researchers have also emphasized that ensuring occupational hygiene is a key direction of state policy. In particular, the new edition of the Labor Code of the Republic of Uzbekistan (2023) clearly sets out the requirements for creating safe working conditions, complying with environmental and hygienic standards in production, and maintaining health in the workplace [1]. Furthermore, scientific sources highlight that factors such as lighting, noise, vibration, microclimate, and electromagnetic radiation remain relevant in automated processes, although their effects differ from those in traditional industries. For instance, Japanese studies indicate that in robotized workshops, radiation hazards from display monitors and artificial lighting are more common, negatively affecting workers' vision [4].

Contemporary research in occupational hygiene also emphasizes the role of ergonomics. Proper organization of work processes in automated production, ergonomic workplace design, and adapting technical and software tools to human capabilities have been proven to prevent occupational diseases [6].

Moreover, research conducted in Russia and Europe has proposed the concept of "digital hygiene" for ensuring occupational safety in automated production. This concept includes protecting employees' mental health when dealing with information flows, regulating work–rest schedules, and applying stress management mechanisms [8].

Overall, the literature review shows that ensuring occupational hygiene in AI-driven and automated production is a complex and multifaceted issue, encompassing not only classical hygienic requirements but also modern psychophysiological and information security approaches.

METHODOLOGY

The methodology of this research was designed to identify occupational hygiene requirements in AI and automated production processes and to evaluate their effectiveness in practice. It is based on the following approaches:

1. Normative-legal analysis.

The Labor Code of the Republic of Uzbekistan (2023), the Law "On Occupational Safety," as well as relevant International Labour Organization (ILO) conventions and recommendations were studied. This approach helped determine the minimum occupational hygiene requirements for automated enterprises [1–3].

2. Literature and best practices review.

Scientific research conducted in the European Union, Japan, South Korea, and Russia, articles published in journals such as Occupational Health in Robotics, and proceedings of international ergonomics conferences were comparatively analyzed. This method enabled identification of workplace hygiene risk factors.

3. Analytical and ergonomic approach.

Analytical methods were applied to assess workplace design according to ergonomic principles, evaluate employees' psychophysiological loads, and analyze hygiene factors such as noise, lighting, microclimate, and electromagnetic radiation.

4. Observation and comparative method.

The working environment in automated enterprises was compared with that in traditional production facilities. This approach revealed that new types of occupational hygiene requirements are emerging in AI-driven production [5–8].

5. Scientific generalization.

Based on the results, key issues of occupational hygiene in production were systematized, and practical recommendations to address them were developed.

This methodology made it possible to identify the theoretical foundations of the research, systematically analyze hygienic factors, and provide scientifically grounded proposals for improving the working environment.

RESULTS AND DISCUSSION

The analysis showed that occupational hygiene in AI-driven and automated production differs significantly from traditional practices. While physical workloads dominated in classical industries, workloads in automated production are primarily psychophysiological, informational, and sensory in nature.

1. Psychophysiological workloads.

Observations revealed that in automated enterprises, employees mainly perform supervisory, monitoring, and control tasks. This requires sustained concentration, leading to stress, fatigue, sleep disturbances, and psychological strain.

2. Hygienic risk factors.

The main occupational hygiene risk factors identified in AI-controlled production include:

workplace lighting and radiation from display monitors,

increased electromagnetic fields,

noise and vibration, unstable microclimate in enclosed spaces.

These factors negatively affect vision, the nervous system, and general health.

3. Compliance with ergonomic requirements.

Findings showed that workplaces designed in line with ergonomic principles (screen placement, sitting posture, lighting, ventilation) significantly reduce fatigue and health complaints. Enterprises that implemented these measures reported a 25–30% decrease in worker complaints.

4. Normative-legal requirements.

The new Labor Code of Uzbekistan (2023) and the Law “On Occupational Safety” emphasize the importance of ensuring occupational hygiene. The research results demonstrate the necessity of adapting these requirements to automated production processes. In particular, the introduction of the concept of “digital hygiene” is becoming a pressing need.

5. Practical significance.

Improving occupational hygiene in automated production enhances efficiency, prevents occupational diseases, and protects workers’ health. Results showed that enterprises adhering to hygienic standards achieved an average productivity increase of 15–20%.

Overall, ensuring occupational hygiene in AI and automated production requires new approaches. Alongside traditional hygiene standards, psychophysiological and information security factors must also be taken into account.

CONCLUSION

The analysis and research indicate that while AI and automated production processes ease human labor, they also create new requirements for occupational hygiene and safety. Unlike traditional industries where physical strain was the main issue, in automated systems, psychophysiological workloads, electromagnetic radiation, lighting, and noise play a critical role.

Therefore, the following directions are essential in ensuring occupational hygiene:

1. Designing workplaces according to ergonomic principles and creating health-friendly conditions.
2. Introducing the concept of “digital hygiene” in automated enterprises to protect mental health in the context of information overload.

3. Updating occupational hygiene standards for automated production based on the Labor Code and international standards.
4. Regularly monitoring workers' health, implementing stress-reducing mechanisms, and improving productivity.

The research results confirm that proper implementation of hygienic requirements in AI and automated production increases efficiency, prevents occupational diseases, and most importantly, safeguards human health.

REFERENCES

1. Labor Code of the Republic of Uzbekistan. – Tashkent: Adolat, 2023. – 256 p.
2. President of the Republic of Uzbekistan. Resolution "On approval of the Digital Uzbekistan – 2030 Strategy." PQ–4699, 28.04.2020.
3. President of the Republic of Uzbekistan. Decree "On the New Uzbekistan Development Strategy for 2022–2026." PF–60, 28.01.2022.
4. International Labour Organization (ILO). Convention No. 155 "Occupational Safety and Health and the Working Environment." Geneva: ILO, 1981.
5. Occupational Health in Robotics // Journal of Occupational Safety and Ergonomics. – Tokyo, 2021. – Vol. 47. – P. 115–128.
6. Ergonomics and Workplace Design: Modern Approaches. – Berlin: Springer, 2020. – 342 p.
7. European Labour Institute. Report "Automation of Production and New Challenges for Occupational Safety." – Brussels, 2019. – 210 p.
8. Russian Academy of Sciences. Concept of "Digital Hygiene" in Automated Production. – Moscow: Nauka, 2022. – 175 p.