

ANALYSIS OF OCCUPATIONAL DISEASES OF WORKERS IN THE MINING AND METALLURGICAL INDUSTRIES

O.G. Martynenko¹, V.S. Vambol², I.O. Mezentseva³, Kuzmenko O.O.⁴

¹ bachelor's student of the Department of Electrical Devices, NTU "KhPI", Kharkiv, Ukraine

² bachelor's student of the Department of Occupational Safety and Environment, NTU "KhPI", Kharkiv, Ukraine and bachelor's student of the Faculty of Civil Engineering and Architecture, Lublin University of Technology, Lublin, Poland

³ professor of the Department of Occupational Safety and Environment, Candidate of Technical Sciences, Associate Professor, NTU "KhPI", Kharkiv, Ukraine

⁴ associate professor of the Department of Occupational Safety and Environment, Candidate of Technical Sciences, Associate Professor, NTU "KhPI", Kharkiv, Ukraine
iryana.mezentseva@khpi.edu.ua

Occupational diseases are a component of industrial injuries, but unlike accidents that occur suddenly, they are the result of prolonged exposure to various harmful production factors on workers. Every year, 260 million new cases of occupational diseases are detected in the world, which require treatment with reimbursement of costs and significant payments in the event of permanent disability or death of the patient. The costs associated with occupational diseases in Ukraine amount to more than 16.04 billion UAH. or 90.4 thousand UAH. per year per case of occupational disease [1].

Among occupational diseases in Ukraine, respiratory diseases are in first place, diseases of the musculoskeletal system are in second place, hearing diseases are in third place, and vibration disease is in fourth place [2, 3]. Figure 1 shows data on the total number of workers who received chronic occupational diseases (CODs) in Ukraine from 2016 to 2022 and statistical data in the mining industry. The figure shows that CODs in the mining industry account for 84 to 90% of the total number of cases. It is noteworthy that the largest number of CODs occurred in 2021. The authors of the works [3, 4] draw attention to the fact that the surge in occupational diseases in 2021 is associated with the coronavirus pandemic. The decline in CODs in 2022 may be associated with military operations in Ukraine and the complexity of the procedure for establishing a connection between the disease and working conditions.



Fig. 1 – Dynamics of the number of cases of chronic occupational diseases at enterprises in Ukraine in 2017–2022

Work in the mining industry is considered to be a high-risk occupation, where workers are most likely to develop respiratory diseases. Workers are exposed to industrial dust, mainly of fibrogenic action (silicon oxide or dioxide, silicates, etc.). A large number of musculoskeletal diseases are

associated with difficult working conditions, and hearing diseases are associated with industrial noise. The most common diseases among foundries are silicosis and dust bronchitis, as well as vibration disease and cochlear neuritis of the auditory organ. A large number of chronic occupational diseases in Ukraine are observed in the mining and metallurgical industries, where difficult and dangerous working conditions, physically and technically outdated equipment, ineffective worker protection systems, etc. remain [1]. At the same time, the introduction of new technologies and equipment requires employers to make large capital investments.

The main circumstances that led to the emergence of chronic occupational diseases (CODs) in the period from 2018 to 2022 are: (Fig. 1), were imperfection of the technological process, non-use of personal protective equipment, imperfection of mechanisms and working tools. The percentage of cases due to imperfection of the technological process increased by 50%, and due to imperfection of mechanisms and working tools decreased by approximately 50%. Non-use of personal protective equipment did not significantly affect the number of cases during this period and amounted to 13±2%. "Other" circumstances of CPZ accounted for 40-43% of all diseases. These figures relate mainly to the mining industry. That is, to reduce the number of diseases, it is first of all necessary to improve technological processes and working mechanisms and tools used in the extraction of minerals.

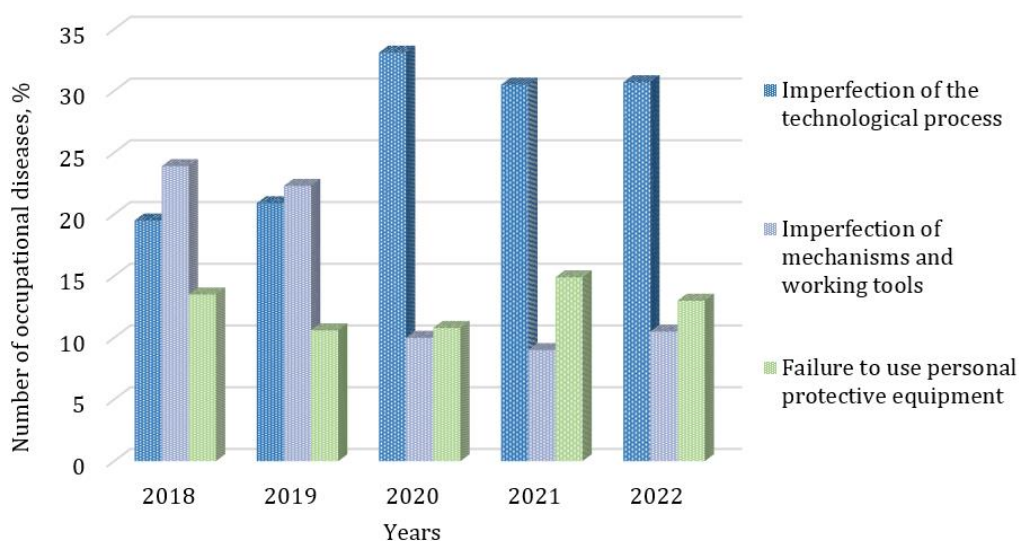


Fig. 2 – Circumstances that caused occupational diseases in 2018–2022

In order to reduce the impact of harmful factors on workers, it is necessary to improve and modernize technologies and equipment, introduce complex mechanization, automation, and remote control of production processes. To protect the respiratory and hearing organs, it is necessary to develop and improve collective and individual protective equipment. The introduction of an automatic alarm system in the event of an emergency increase in the concentration of harmful substances in the air and increasing the efficiency of ventilation systems will reduce the number of respiratory diseases.

References:

1. Trends and Challenges of Chronic Occupational Morbidity in Ukraine: A Sectoral Analysis and Preventive Strategies / Iryna Mezentseva [et al.] // Diversity: Disease Preventive of Research Integrity. – 2025. – Vol. 5, iss. 2. – P. 60-68. <https://doi.org/10.24252/diversity.v5i2.52247>
2. Березовский А. П., Трус А. Н., Прокопенко Э. В. Аналіз професійних захворювань на виробництві в Україні // Вісник аграрної науки Причорномор'я. 2021. Вип. 3 (111).
3. Problems of occupational injuries and ways of its reduction on example of Ukraine / I. Mezentseva [et al.] // Diversity: disease preventive of research integrity. – 2024. – Vol. 4, Issue 2. – P. 54-62. <https://doi.org/10.24252/diversity.v4i2.42873>
4. Мезенцев С. М. Запорука майбутнього життя - безпека праці / С. М. Мезенцев, Н. С. Євтушенко, І. О. Мезенцева // Future Healthcare: Innovations, Advances and Progress : proc. of the 2nd Intern. Sci. and Practical Internet Conf., June 15-16. – Dnipro : FOP Marenichenko V. V., 2023. – P. 105-107. <https://repository.kpi.kharkov.ua/handle/KhPI-Press/66492>