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## **LABOR CONDITIONS AT MINING AND METALLURGICAL ENTERPRISES AND THEIR INFLUENCE ON THE HEALTH OF BASIC PROFESSIONAL WORKERS (short review)**

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### **Abstract**

The present work gives an analysis of the current state of working conditions at mining and metallurgical enterprises in Uzbekistan. A set of harmful factors of labor for the main occupational groups that determine the development of occupational diseases is specified and promising hygienic directions for their reduction are identified.

**Key words:** professional groups, mining and metallurgical enterprises, a complex of harmful factors of work, professionally determined morbidity, morbidity prevention

### **Introduction**

The aim of the work is to conduct an analytical analysis of the hygienic characteristics of the conditions and nature of the labor of workers employed in enterprises of the mining and metallurgical industry, which have a negative impact on the health of workers and determine promising measures to eliminate them.

According to the concept of long-term socio-economic development of the Republic of Uzbekistan [25], large-scale events aimed at continuous economic growth are carried out in the country. In order to increase economic power in the republic, industrial zones are created and operate to ensure freedom of economic development activity, in particular, Andijan, Bukhara, Jizzakh, Kashkadarya, Navoi, Namangan, Surkhandarya and Khorezm industrial zones [23, 24, 31–33].

The structure of the newly created industrial zones covers a large number of fields, including mining enterprises, which have a wide range of occupational

factors and have varying degrees of exposure to the body of workers, which leads to a high increase in occupational diseases among the working population. In these conditions, one of the urgent scientific priorities of the hygienic sciences is the search for measures aimed at maintaining the health of the able-bodied population.

About 2 million people die every year in the world as a result of industrial accidents and occupational diseases, about 270 million accidents and 160 million occupational diseases are registered [18]. An assessment of the working conditions of workers in neighboring countries with a highly developed network of industrial production in 2012 showed that the proportion of workers in harmful and dangerous working conditions in the Russian Federation, in mining made 46.2%, in manufacturing - 33, 4%, in transport and communications - 27.7% [22]. According to the conclusion made by the author, every third worker worked in conditions that do not meet sanitary and hygienic requirements, which led to the increase in work-related diseases and disability of workers.

The analysis of the literature indicates that the field of view of foreign and domestic scientists is the problem of the influence of formed multi-component adverse conditions of the working environment and the labor process on the health of workers [2, 17].

Scientific researches proved that workers employed mainly in mining and metallurgical industries have the highest level of professional risk, as they are exposed to multifactorial effects in production conditions, the effect of which is many times greater than the isolated effect of a single harmful factor.

Kazakhstani scientists have shown that the labor activity of workers in the main professions (crane operator of metallurgical production, ferroalloy breaker, repairman, electric welder and gas cutter, refractory worker, etc.) is performed under the impact of a complex of adverse factors, the totality of which at workplaces was related by dangerous indicators and hazards of the environment to classes 3.1 - 3.4 [4].

The multifactorial effect of industrial hazards in various combinations has been established at workplaces at all stages of copper production - from ore mining to the production of refined copper. [1]. It has been shown that metallurgists in copper production contact with carcinogens (arsenic, cadmium, lead, nickel, benz (a) pyrene, crystalline silicon dioxide, etc.), which cause the development of occupational cancer [20].

Of particular interest are hygienic studies of the labor activity of workers engaged in open mining of ores [14]. The researchers found that the labor activity of workers engaged in the open mining of chrome ore proceeds under the influence of a cooling microclimate, high humidity, intense noise (excess of the maximum

permissible level by 10-25 dBA) and vibration (by 2-15 dB), and according to their hygienic classification labor refers to the degree of harmfulness and danger to class 3.3. At the same time, the working conditions of employees in enrichment plants are characterized by high levels of dust, relative humidity, low light, intense noise, increased physical and psycho-emotional stress.

Studies conducted at large metallurgical industries showed that this type of enterprise is characterized by a complex of working conditions including factors of a physical nature, namely, elevated air temperature of the working area; increased noise and vibration levels; the presence of exposure to various radiation - thermal, ionizing, electromagnetic, laser; dustiness and gas contamination of air; adverse light environment. In addition, a large number of aggressive respirable agents are formed during the manufacturing process. The multicomponent composition of the agents carries a number of toxicological threats, exerting an irritating, fibrogenic, allergenic, carcinogenic, and mutagenic effect on the worker's body [12, 19, 30].

The most striking manifestation of the combined effects of negative physical and chemical environmental factors with high physical and neuropsychic loading is noted in the metallurgical industry. In this regard, when assessing the risks of complex effects, it becomes necessary to conduct scientific research in the assessment and leveling of production risks.

Scientific studies have shown that a combination of negative factors contributes to the growth of occupational diseases among enterprise workers [34]. Thus, the study of the hygienic features of working conditions and their impact on the health of workers engaged in the production of ferrovanadium showed that the fractional composition and concentration of dust have a direct effect on the formation of pathology from the respiratory system [37]. At the same time, a change in immune homeostasis both in chromium production workers and in the population living near chromium production is due to the immunotoxic effect of chromium and its compounds [21].

Today, specialists in the medical and prophylactic profile based on the modern concept of evidence-based medicine conduct scientific research on the role of the influence of negative labor factors on the development of professionally determined and occupational diseases [8, 10, 11]. At the same time, the structure, level and dynamics of both general and occupational morbidity are revealed, a prognosis of occupational risk for workers of enterprises and the industry as a whole is given [3, 16, 18, 29, 36].

Thus, when studying the working conditions of workers in the mining industry, it was shown that despite the impact on the body of workers of a different complex of adverse production factors, for workers in the main professions:

drifters, drillers, miners, face drivers, excavators, drivers of heavy trucks, a pathology is characteristic, caused by physical factors of the production environment, namely, vibration, noise, physical activity, unfavorable microclimate [27]. The leading disease classes are defined in the structure of the incidence rate with VUT of mining enterprises - these are diseases of the musculoskeletal system and connective tissue, respiratory diseases, injuries, poisoning and some other consequences of external causes. The incidence rate according to these nosologies in the control group is lower than in the main ( $p < 0.05$ ). This structure is noted in all senior groups [28].

It is well known that adverse working conditions increase the risk of developing not only occupational, but also occupationally caused diseases, exacerbate their medical and social consequences, and reduce the labor potential of society [5, 6, 35]. One of the leading measures to prevent and reduce the level of development of occupational and production-related diseases is prevention, which includes a system of medical and social measures [7, 13].

In the system of measures of dynamic hygienic monitoring of the workers health condition, it is attached to means of monitoring the quality of the working environment by timely certification of production facilities according to working conditions. Experience shows that the identification of the rank level of harmful production factors and the establishment of relationships between individual forms of diseases and indicators of harmful production factors allows us to establish the cause of occupationally caused diseases in standard workplaces.

Scientifically substantiated arguments are expressed about the advisability of developing programs aimed at primary prevention of the development of occupational diseases, taking into account the individual characteristics of the employee's body and a comprehensive hygienic assessment of working conditions at a particular workplace [11].

The current set of preventive measures is aimed at studying the structure and degree of professional risk, improving the technological process, optimizing the workload and streamlining the regime of production activities of workers and their rest, and using personal protective equipment.

A number of scientists recommend reducing the contact time of workers with negative labor factors using various forms of time protection, which include rational work and rest regimes, a shorter working day, and additional leave before the introduction of technical measures to limit harmful factors and taking into account the low effectiveness of personal protective equipment by scientists. This emphasizes the need for mandatory monitoring of workers. Along with other factors, therapeutic and preventive nutrition plays an important role in the arsenal

of tools for the prevention of occupational diseases [9, 15, 26]. At the same time, the basics of therapeutic and prophylactic nutrition of people working in hazardous industries have not been practically reviewed in recent years. However, in connection with the improvement of the technological level of a number of industries, the emergence of new extreme labor factors, the need arose to rationalize the nutrition of mining workers and to review the current system of therapeutic and preventive nutrition.

## Conclusions

1. Working conditions at mining enterprises are characterized by the combined effects of negative physical and chemical environmental factors with high physical and neuropsychic loading.
2. It is proved that adverse working conditions increase the risk of developing both occupational and occupationally caused diseases.
3. In the system of measures for the primary prevention of the development of occupational diseases, an important role is given to a comprehensive hygienic assessment of working conditions at a particular workplace, taking into account the individual characteristics of the employee's body, mitigating the effects of harmful labor factors by rationalizing the nutrition of mining workers and reviewing the current system of therapeutic and preventive nutrition.

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