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# Determination of the occupational risk to the health of marble production workers, taking into account the indicator "class of working conditions according to the degree of harmfulness and danger"

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**ABSTRACT**

In modern preventive medicine, increasing attention is being given to predicting occupational risks to workers' health when assessing working conditions and the nature of work. This approach enables the identification of potential risks and the likelihood of developing occupational diseases.


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# “Zararlilik va xavflilik darajasi bo‘yicha mehnat sharoitlari klassi” ko‘rsatkichini hisobga olgan holda marmar ishlab chiqaruvchi ishchilar uchun kasbiy sog‘liq uchun xavflarni aniqlash

***Kalit so‘zlar:***
profilaktika,
professional tibbiyot,
sanitariya me’yorlari.

**ANNOTATSIYA**

Zamonaviy profilaktika tibbiyotida mehnat sharoitlari va xarakterini tahlil qilishda ishchilarning sog‘lig‘i uchun kasbiy xavflarni bashorat qilishga e’tibor ortib bormoqda. Ushbu yondashuv potentsial xavflarni aniqlash va kasbiy kasalliklarning rivojlanish ehtimolini baholash imkonini beradi

# Определение профессионального риска для здоровья работников мраморного производства с учетом показателя «класс условий труда по степени вредности и опасности»

***Ключевые слова:***
профилактическая,
профессиональная медицина,
санитарные нормы.

**АННОТАЦИЯ**

В современной профилактической медицине всё большее внимание уделяется прогнозированию профессиональных рисков для здоровья работников при анализе условий и характера труда. Такой подход позволяет выявлять потенциальные риски и оценивать вероятность развития профессиональных заболеваний.

**INTRODUCTION**

In modern preventive medicine, when assessing the conditions and nature of work, more and more attention is paid to predicting the occupational risk to the health of workers, which makes it possible to determine the possibility of developing occupational diseases [1, 2]. The possibility of developing a change in the state of health of workers is largely determined by the individual sensitivity of his body to the action of harmful and dangerous factors of the industrial environment. The solution to such problems is relevant for occupational medicine since research in this direction can be useful in developing a forecast of the individual risk of developing occupational diseases and choosing preventive measures [3, 4].

**The purpose of the study** is to develop a system of preventive measures based on an assessment of the possibility of developing production-related and occupational pathology among workers in the marble industry.

**METHOD:**

To predict occupational risks to the health of workers in a marble enterprise, a methodology developed in the fields of sanitation, hygiene, and occupational diseases was utilized. This methodology assesses the level of occupational risk by considering the class of working conditions, based on the degree of harmfulness and danger.

To determine the class of working conditions, the working environment of employees at the marble product manufacturing enterprise "Kizil Tosh" was studied using standard laboratory and instrumental methods for analyzing harmful factors.

Industrial noise levels were measured with ISHV-1 sound level meters, and the results were evaluated in accordance with San-PiN 0325-16, "Sanitary norms for permissible noise levels at workplaces." Temperature and relative humidity were measured using an Assman psychrometer, while air velocity was determined with a catathermometer. The measurement data were compared with the standards outlined in San-PiN 0324-16, "Sanitary norms for the microclimate of industrial premises."

The dust content in the air was assessed using the aspiration method. Dust concentration in the workplace air was evaluated in compliance with GOST 12.1.005-88, "General sanitary and hygienic requirements for the air of the working area," and San-PiN 0046-95, "Hygienic standards for harmful substances in the air of the working area To determine the class of working conditions, the working conditions of the workers of the enterprise for the manufacture of marble products "Kizil Tosh" were studied using generally accepted laboratory and instrumental methods for studying harmful factors. Industrial noise was measured with a sound level meter. IShV – 1 (Russia), the results were evaluated according to SanPiN No. 0325-16 "Sanitary norms for permissible noise levels in the workplace." The temperature and relative humidity were measured with an Assmann psychrometer, the air velocity was measured with a catathermometer, and the measurement data were compared in accordance with SanPiN No. 0324–16 “Sanitary norms for the microclimate of industrial premises." The temperature and relative humidity were measured with an Assmann psychrometer, the air velocity was measured with a catathermometer, the measurement data were compared by SanPiN No. 0324 – 16 "Sanitary standards for the microclimate of industrial premises". The dust content of the air was determined by the aspiration method, and the concentration of dust in the air of the working area was assessed according to GOST 12.1.005 – 88 "General sanitary and hygienic requirements for the air of the working area" and SanPiN No. 0046 – 95 "Hygienic standards. MPC of harmful substances in the air of the working area. Illumination was measured using a light meter brand Yu – 116, and the evaluation of the results was carried out taking into account KMK 2.01.05-98 "Natural and artificial lighting".

The general assessment of working conditions by class and the degree of harmfulness was carried out in accordance with the "Methodology for assessing working conditions" (2004), San PiN Republic of Uzbekistan No. 0141 – 03 "Hygienic classification of working conditions in terms of harmfulness and danger of factors in the working environment, the severity, and intensity of the labor process." Occupational risk was determined in accordance with the methodological recommendations "Hygienic prediction of occupational risk to the health of workers depending on the class of working conditions in terms of the degree of harmfulness and danger (according to a generalized indicator of the class of working conditions) and substantiation of the occupational causation of morbidity with temporary disability" (2004).

The results of hygienic studies were taken into account when developing preventive measures aimed at improving working conditions and organizing the labor process, reducing its severity and tension, increasing efficiency and maintaining the health of marble production workers.

**RESULTS AND DISCUSSION**

The technological process at the Kizil Tosh enterprise consists of the following steps: hydraulic cutting of marble slabs on special machines, grinding and, if necessary, polishing the surfaces of marble products, and applying a pattern or a certain mosaic to the finished surface.

In the course of studying this technological process, the main types of production factors were identified: noise, cooling microclimate, dust content in the air of the working area, and physical stress. At the Kizil Tosh enterprise, marble dust remains the leading harmful factor, the average concentration of which is 10.8 at a MPC of 6 mg / m the class I degree.

Also, one of the most important hygienic characteristics of the production under study is a cooling microclimate, which is associated with the use of water in the process of cutting and polishing marble. Thus, at these workplaces, the average air temperature is 23°C (at a norm of 24–25°C, taking into account the severity of the work performed), relative humidity is 85% (at a norm of 40–60%) and the air velocity is 0.25 m/s. s (at a rate of 0.1 m/s), which does not meet hygienic standards. To assess working conditions in terms of industrial microclimate, the class of harmfulness of working conditions was determined by temperature and relative humidity. Thus, the working conditions of carvers and grinders belong to the 3rd class of the II degree, and painters – to the 3rd class of the I degree.

Along with dust and meteorological factors in the production of marble products, production noise also plays a leading role, to which workers are exposed throughout the entire work shift. The noise that occurs mainly during the operation of cutting and grinding machines is mechanical in origin, constant in time, and broadband in the spectrum. The greatest excess of its levels was noted at the workplaces of grinders. Thus, the analysis of the spectral composition of noise showed that at frequencies of 250 – 4000 Hz, it is exceeded by 12 – 16 dB, which made it possible to classify the working conditions of grinders when exposed to industrial noise as harmful, which corresponds to the 3rd class II degree, carvers – 3- mu class I degree, and painters – to the admissible 2nd class.

***Classes of working conditions for marble production workers, taking into account the degree of harmfulness and danger, the severity and intensity of the labor process.***

| Factor | Cutter | Painter | Grinder |
|---|---|---|---|
| Dust | 3.1 | 3.1 | 3.2 |
| Noise | 3.1 | 2 | 3.2 |
| Microclimate | 3.2 | 3.1 | 3.2 |
| Lighting | 3.1 | 3.1 | 3.1 |
| Severity | 3.1 | 3.1 | 3.3 |
| Tension | 3.1 | 3.2 | 3.2 |
| General assessment of working conditions | 3.2 | 3.2 | 3.3 |

Another negative factor affecting the body of workers is the low illumination of the workplace. To ensure successful visual work and the activity of the organism as a whole, the creation of rational conditions for natural and artificial lighting is of great importance. Production operations in the marble industry are associated with strain on

the organs of vision, which places increased demands on the organization of lighting. Measurements of actual illumination showed that in most cases there is insufficient and uneven illumination levels at workplaces during the work shift. Thus, the work of painters requires the tension of the visual analyzer, but at the same time, the intensity of lighting in the workplace does not meet hygienic requirements. The reasons for insufficient illumination at workplaces are the insufficient number of artificial lighting fixtures, dimming of light by equipment, low reflectivity of walls and ceilings, and irrational lighting.

Taking into account the severity and intensity of the labor process, the working conditions of workers in marble production are characterized as harmful in the range from the first to the third degree of the 3rd class of working conditions, while the most difficult work was determined by the grinders of the marble production.

The above-presented studies, to a certain extent, made it possible to comprehensively and sufficiently fully give a hygienic description of the main factors of the production environment of marble production, from differentiating the studied conditions there according to the degree of deviation of the parameters of the production environment and the labor process from the current hygienic standards by the possible influence of these deviations on the functional state and health of workers.

Taking into account the above, we have given a general assessment of the working conditions of workers in marble production, taking into account the degree of harmfulness and danger, and the severity and intensity of the labor process (see table).

According to the general assessment of working conditions, the occupational health risk for the workers of the enterprise under study was determined, due to a combination of the impact of adverse production factors: dusty air in the working area, cooling microclimate, noise, low level of industrial lighting and intense physical activity. Thus, according to the indicator of the class of working conditions, the level of occupational risk to the health of workers in marble production was determined – from low to above average. At the same time, the level of occupational risk is higher than average for grinders (3.3), while carvers and painters are low (3.2). Based on the research results obtained, we have given recommendations for improving the working conditions of the workers of the Kizil Tosh marble production. To limit the adverse effects of dust in the source of formation, it is necessary to remove it using mechanical local exhaust ventilation with a suction speed of at least 3–4.5 m/s. To reduce noise at the source of noise, it is necessary to use damping pads on the colliding parts made of rubber, and fiber. To ensure adequate lighting, local fluorescent lamps must be used above the work surfaces. Regardless of the stage of the technological process, it is necessary to provide workers with personal protective equipment. To prevent occupational diseases and reduce overall morbidity, it is necessary to undergo medical examinations following order No. 200 of the Ministry of Health of the Republic of Uzbekistan. Thus, according to the indicator of the class of working conditions, the level of occupational risk for grinders of the enterprise producing marble products is above average, for carvers and painters it is low.

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