

Ensuring health of shift workers in context professional risks in the Arctic

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Abstract— The reported study was funded by RFBR according to the research project № 18-013-00623. The Arctic is a territory characterized by a huge area, special climatic conditions, and also rich reserves of natural resources. Currently, the region is actively developing projects for the extraction of minerals. The development of this area can be carried out if there is an able-bodied population that is able to work effectively in extreme conditions. Work in such conditions is carried out mainly on shift-work method and places high demands on the level of health of the worker. Climate-geographical, production and social factors determine professional risks for the health of workers employed in shift work. The concept of "professional risk" includes the negative impact of the environment, the conditions of professional activity, as well as the possible nature of the negative reaction of the body and mind. The identification and assessment of professional risks should be aimed primarily at preventing the development of a threat to the health, morbidity and disability of an employee. An integral system of occupational risk management is medical support for shift workers, also features of the legal regulation of labor. This regulation of the countries of the Arctic region should take into account the peculiarities of the territory. The purpose of our research is to study the issues of preserving health of shift workers in the Arctic region. As a result of the study, an analysis of legal regulation will be carried out, which is aimed at ensuring preservation health of workers employed in field of shift work, identifying measure criteria professional risk, including assessment of injuries, loss of professional performance, disability, etc. The study of ensuring the preservation of the health status of workers employed in shift work will make it possible to develop a model of optimal support for shift workers in the Arctic region.

Keywords— *shift workers; professional risks; ensuring health*

I. INTRODUCTION

Currently, the creation of new oil and gas producing areas in the Arctic region is a very high priority. The territory of the Arctic characterized by extreme climatic and production conditions, lack of infrastructure and long distances for transportation of products, delivery of personnel and equipment to the workplace. In such extreme conditions, the shift method of labor is used. Climate-geographical, production and social factors impose high demands on the organism of a shift worker. These requirements far exceed the reserves of the body [6]. This phenomenon excludes the possibility of full adaptation of the organism to severe conditions and determines the presence of professional health risks.

Identifying professional risk criteria, examining their impact on workers (especially those employed in shift work), monitoring health and safety in the workplace, studying accidents and occupational diseases - all this is part of the task of managing professional risks.

II. PROFESSIONAL RISKS

Professional risk is the possibility of damage (loss) of health or death linked with the performance of obligations under an employment contract and in other cases provided by law [1].

Professional risk management is a complex of interrelated measures that are elements of a labor protection management system and include measures to identify, assess and reduce levels of risks.

Planning of professional risk management activities should be based on the results of the analysis of the initial information, which includes: the results of preliminary and periodic medical examinations, the results of the analysis of professional injuries, the results of the analysis of professional diseases.

In the most general form, the criteria for professional risk are damage (loss) of health or death.

According to standard damage, indicators reflect:

- deterioration of the health status of the employee and / or his offspring;

- violation of the functional state of the body;
- reduction of life expectancy;
- impaired psychosocial well-being (job satisfaction, family, income and health) [3].

The study of the regulatory framework regarding occupational risks revealed the following criteria (Table 1).

TABLE 1- CRITERIA of PROFESSIONAL RISKS

Regulatory documentation that establishes the criteria	Criteria
Federal Law № 125-ФЗ dated 07.24.1998 “On compulsory social insurance against industrial accidents and occupational diseases” [2]	Work accident
	Occupational injuries
	Professional Illness
	Temporary disability
	Permanent disability
	Mortality
R 2.2.1766-03. A guide to assessing occupational health risk for workers. organizational and methodological foundations, principles and evaluation criteria [4]	Occupational diseases
	Loss of professional disability
	Infectious diseases
	Injuries
	Industrial accidents

As shown in Table 1, the criteria for professional risks are persistent and / or irreversible health disorders of workers, which occur under the influence of production factors. Identification and risk assessment are aimed primarily at preventing the development of pathological conditions, loss of health and working ability of staff. At the same time, the assessment of professional risks does not allow to fully achieving this goal, since the criteria are single and represent a small percentage of all health losses by employees.

III. MATERIALS AND METHODS

A study was made of the general level of morbidity and with temporary disability in 300 shift workers in the Arctic.

Research methods:

1. The method of theoretical analysis.
2. Studying the health status of employees:

- Questionnaire.
- Examination of the data of the in-depth medical examination of workers by the team of medical specialists conducting medical examinations.

3. The study of the organization of medical support of work in enterprises using rotational forms of labor:

- Study of the methods and forms of medical support when using rotational forms of work in the Arctic.
- Analysis of statistical reporting for the study of methods and forms for studying the effectiveness of the use of various activities to preserve the health level of workers in rotational work conditions in the Arctic.
- Analysis of the relationship of the applied methods and forms of medical support when using rotational forms of work and the level of morbidity, disability, occupational diseases.

Means used:

- Blanks;
- Medical and reporting documentation
- Documentation of certification of workplaces

IV. RESULTS AND DISCUSSION

According to the results of periodic medical examinations and seeking medical care, diseases of the eye and its appendages, cardiovascular system, musculoskeletal, endocrine, urinary and respiratory systems (Table 2) [6, 8] are the most commonly diagnosed.

TABLE 2 - THE STRUCTURE OF THE INCIDENCE OF OIL PRODUCING SHIFT WORKERS

Diseases	Share in the structure according to medical examinations, %	Rank according to medical examinations
Eye diseases H00-H59	27,0	1
Circulatory system diseases, I00-I99	20,6	2
Diseases of the musculoskeletal system M00-M99	10,0	3
Diseases of the digestive organs K00-K99	9,2	4
Diseases of the genitourinary system N00-N99	8,9	5
Diseases of the endocrine system E00 E89	6,0	6
Respiratory Disease J00-J98	3,1	7
Neoplasm C00-D48	2,9	8
Diseases of the ear H60-H95	2,1	8
Diseases of the nervous system G00-G98	1,7	9
Diseases of the skin and subcutaneous tissue L00-L98	1,5	10
Mental disorders F00-F99	1,2	11
Injuries, poisonings S00-T98	0,7	12

According to the general morbidity, diseases of the respiratory organs are in the first place, diseases of the circulatory system and the musculoskeletal system are in second and third places, digestive organs are in 4th place, eyes and the endocrine system are in 7-8 places [7].

Such discrepancies can be explained with the help of the phenomenon of presentism among the employees of the oil and gas producing enterprise. Presentism - the phenomenon of reduced working capacity, which is associated with impaired health of workers present in the workplace. [10]

The main causes of the phenomenon are colds (flu, ARVI). The situation in which workers do not take sick leave, but also cannot fully perform their work duties due to poor health, is becoming increasingly common in our time. Presentism creates serious risks for the stable operation of the enterprise and poses a serious threat to the health of the worker as a whole.

Professional morbidity, along with the professional competence of specialists, are components of the "human factor" that affects the safety and reliability of production. In the structure of morbidity of shift workers, injuries are in 12th place [9].

Reducing the level of morbidity, disability, occupational pathology, mortality, and, consequently, the costs of the social security system, are directly related to the level of medical support, injuries, the number of emergency situations at work.

Were identified shortcomings in the organization and conduct of periodic medical examinations, which reduce the quality of medical examinations and prevent the timely detection of early signs of occupational pathology of workers:

1. The lack of special training of doctors for diseases characteristic of shift workers (occupational diseases).
2. Lack of necessary equipment in medical institutions.
3. Insufficient attention of employers to the fact that workers undergo medical examinations.
4. Poor quality of medical examinations.
5. The absence in the final acts of information about the existing hazards in the workplace.

Thus, the main causes of occupational risks associated with the organization, volume and quality of medical care:

1. Insufficient qualifications of medical personnel in professional medicine.
2. The inability to identify pathology at an early stage due to the lack of specific studies.
3. Insufficient medical equipment, lack of doctors, necessary specialties.
4. Lack of comprehensive information support (software) for storing, processing, analyzing information, developing rehabilitation and prevention programs.
5. Insufficient motivation of staff to maintain individual health and commitment to a healthy lifestyle, the presence of bad habits [8, 9].

The following measures are possible to reduce the occupational risks associated with the organization, volume and quality of medical care:

1. Professional development of doctors in the field of occupational diseases.
2. Increasing the responsibility of doctors for the quality of medical examinations (analysis of primary morbidity, exacerbation of chronic pathology within a year after a medical examination).
3. Organization of the examination of the quality control of medical examinations.
4. Inclusion in the collective agreement of provisions on the mandatory provision of medical documentation by employees during the preliminary examination.
5. Improvement of employee passport with the introduction of research results and results of certification of workplaces.

6. The development of in-depth programs of periodic examinations based on the analysis of data from periodic medical examinations, a differentiated approach in different groups of personnel.

Medical support for shift personnel is currently considered as an integral part of the professional risk management system, which can significantly reduce the individual professional risk of an employee.

V. CONCLUSION

The concept of "professional risks" combines the negative impact of the environment and the conditions of professional activity, as well as the probabilistic nature of the negative reaction of the body and mind. Professional risk management should represent a set of interrelated measures to identify, assess and lower risk levels.

Medical support of shift workers is currently considered as an integral part of the occupational risk management system, which allows to significantly reduce the individual professional risk of an employee. Labor activity in the conditions of the Arctic places high demands on the level and preservation of employee health. The organization and conduct of periodic medical examinations revealed a number of shortcomings that reduce the quality of medical examinations and impede the timely detection of early signs of occupational pathology of workers. A set of reasons for professional risks caused by the organization, the volume and quality of medical care provided was established, and a list of measures aimed at their elimination was proposed.

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