

UDC 614.8.027 (574)

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GENERALIZED CRITERIA EVALUATION FOR THE QUALITY OF THE WORKING ENVIRONMENT

Abstract

This article analyzes the domestic and foreign experience of different methodologies and forms of approach to the evaluation of generalized criteria and quality of the working environment, risk of injury of the production personnel of modern industrial enterprises, identifies the advantages and disadvantages of each. On the basis of this research goals were reformulated and solutions identified for the management of occupational safety prevention tasks.

Keywords: *production process, indicators of hazards and risks, risk, professional production staff, risk assessment criteria, safety, labor protection, Quality criteria of the working environment.*

According to the ILO estimation annually in the world, for reasons related to employment, nearly two million people killed. For all its monstrous size, by itself mortality rate in the production still does not reveal the whole magnitude of the problem. Still about 160 million people worldwide suffer from diseases associated with work. In each case the third disease leads to disability for four or more working days. The total number of accidents at work around the world (both leading to death, and without it) is estimated at 270 million per year.

Chart 1 summarizes the data on accidents at work in the Republic of Kazakhstan for 2011-2013 [1].

Table 1 – Statistics of occupational injuries in the Republic of Kazakhstan for 2011 - 2013.

Indicators	Years		
	2011	2012	2013
The number of injured in accidents, work-related.	2817	2894	2,623
The number of those killed in accidents, work-related	283	262	266
Tangible effects of accidents, thousands tenge	1264944.5	1511951.1	1,596,916.9

The data presented in Chart 1 indicates decrease in accidents involving injuries, but still the level of danger and risk of injury is high on the country's enterprises.

The level of production personnel injuries remains high in some industries of the Republic of Kazakhstan. In this regard, an urgent task is to assess companies according to the degree of danger and risk of injury of the production staff. As a known fact, the danger - is processes, phenomena, objects that have a negative impact on human life and health, and the risk - is the ratio of those or other adverse effects to their possible number for a certain period, i.e. this is dangers frequency implementation. Existing and applied methodology of risk assessment personnel injury (R) is determined that the ratio of the number of cases of danger (n) the possible number of cases of danger (N), i.e. [2]:

$$R = n / N.$$

However, this method has a major drawback, namely, even in those enterprises where the level of production technology is low, equipment obsolete and out of date and working conditions and jobs do not meet basic safety requirements, but for a certain period of time in the enterprise deaths and injuries are not detected, and that leads to erroneous assessment of occupational risk. The vast majority of enterprises in Kazakhstan conduct industrial injuries analysis only on the basis of the calculation of

the so-called standard indicators of accidents - frequency coefficients, the severity of the accident, and some others. The assessment of the factors that prove rough results of the system danger, however, does not provide information about the nature of possible accidents and their consequences, and therefore practically useless in solving the problem of active safety management in the technical system. Hence the need for the transition to optimize the management of production safety prevention problems based on new methodologies and performance indicators. The basic method of a professional risk assessment of harm to life and health of workers in Kazakhstan has been and continues to be a professionally-group method. This method is based on an assessment of the individual factors of the production environment, their long-term effects on the human body and damage detection to the health of workers based on actual data. At the same time a significant risks for the duration of the historical period of the study were fragmentary, which led to a situation where at the present stage mechanisms and the regulatory procedures for determining the individual risk of health damage in the production, treatment evaluation and management of risk in their infancy. The country is still in use of statistical database in the field of occupational safety and health, which gives only a general idea about the occupational risk levels as a whole for large professional working groups reflection the left (Table 2).

Table 2 – The current system of evaluation and professional risk management in the Republic of Kazakhstan

The existing system of assessment and risk management		
Assessment of risk factors	Impact assessment of risk	Consequences of risk compensation
Evaluation of individual environment factors in working sites	Statistical evaluation of the frequency and severity of production accidents and occupational diseases	Payments for insurance against accidents at work; provision of pensions for work in harmful and dangerous working conditions

As a result, the country's fixed in proportions of employees working in unfavorable conditions of individual risk factors – noise, vibration, dust, gas concentration, etc., but it does not take into account the degree of damage to health and disability of workers in these industries.

At the moment, there are a number of techniques, as a general assessment of operational risk, and risk assessments under the influence of individual factors, which are used in various industries. Conventionally, all the methods of assessing occupational risk values can be divided into quantitative and qualitative.

It is known that the working environment is influenced by a number of simultaneous factors, which have different material nature and characteristics of the effect on the human body. The basis of a priori estimate of the production risk is a quantitative assessment of these factors in comparison with normative values. Analysis of the component factors of working conditions showed that many of them are now not quantitatively evaluated, and some cannot be quantified evaluated (e.g., the degree of compliance with the employee production requirements, forms of division and cooperation of labor, social psychological and aesthetic factors of working conditions, etc.). Many factors of working conditions are not normalized (the level of mechanization of labor, the degree of conformity of equipment and technology psycho-physiological human capabilities, and others.). In addition, there is a common approach in the development of norms and standards of working conditions, according to which each factor is regulated in isolation (without taking into account the simultaneous effect on workers of other factors). Therefore, the use of individual assessments of working conditions factors can significantly distort the real impact of working conditions on the worker. For example, the combined effect of noise and microclimate heating leads to large changes in a person's functional status and reduce its efficiency; cold is a factor that enhances the effects of exposure to vibration and physical activity [3]. The combined effects of factors of working conditions on the worker, as is known, can be manifested in the form of potentiation (disproportionate gain exposure), summing up the effects of the independent actions, as well as the weakening of the final effect.

The risk of damage to the health of workers and developing in conditions of multifactor tiered impact of low and medium intensity. Therefore, along with the problem of quantifying working conditions of each factor, the problem of integral action of all these factors on the worker is very urgent. The need for evaluation of working conditions (including all factors) necessitated the development of new methods of information of particular indicators of working conditions (for each factor) to common generalizing indicators.

Medical and physiological classification of severity of labor was justified at the Research Institute of Labor (Moscow) in the 70s, based on the idea that the human body as a single integrated system integrally respond to impact a wide variety of combinations of factors of working conditions. Based on the terms of integral reaction can be judged on the level of working conditions themselves. The scientific basis for this classification is the physiological theory of functional systems [4].

In addition to the Institute of Occupational techniques, there hygienic classification of working conditions, developed by the Ministry of Health of Kazakhstan, which is set out in R. Guide 2.2.755-99 [5]. This classification involves seven grades in the assessment of working conditions, i.e., entered a dangerous class working conditions. Based on the hygienic criteria, working conditions are divided into four classes: optimal, acceptable, harmful and dangerous. Assessment of working conditions, taking into account the combined and united action of factors of production is carried out as follows: on the basis of the measurement results to assess the working conditions of individual factors in accordance with sections R.2.2.755-99, which take into account the effects of summation and potentiation of the combined action of chemicals, biological agents, different frequency ranges of electromagnetic radiation. The results contribute to the protocol. Overall working conditions in the degree of hazard and danger set:

- For the highest class and the degree of hazard;
- In the case of combined action of 3 or more factors relating to the class of 3.1, the overall assessment of working conditions is a Class 3.2;
- A combination of 2 or more factors of classes 3.2, 3.3, 3.4 - working conditions are estimated, respectively, by one notch higher.

The most significant drawback of this method is that it does not consider the time elements in the workplace for workers in the workplace, as well as the degree of harm to the body in these conditions.

If the technique Institute of Labor, as already noted, it gives an estimate of the severity of labor as a result of the interaction of working conditions and employee of the body, the Guide [5] estimated the actual working conditions, both external to the employee work environment factors and labor. Process that corresponds precisely to the content, which is taken to invest in the concept of working conditions. You can specify that these techniques are related as part of the whole and, therefore, in practice, very useful to share them. In this guide laid very high levels of exposure to some factors, such as noise. If the six-point scale, Institute of Occupational Noise transition from one class to a higher hazard is carried out every 5 dB, the manual - 10 dbA.

Thus, the above methodological approaches to the assessment of working conditions can be described as the objective in terms of the measurement of objects as they are based on the data of instrumental measurements of each factor working conditions. However, they do not include the number of employees in the zone of harmful factors, residence time of people in these areas, the same effect involve different factors on the nature of the human body, that is not true, and, finally, do not account for the qualitative composition of workers.

From the above, it is now known for more than ten different generic assessment of the quality of the working environment techniques. It is also obvious that it is necessary to assess the working conditions, not only the results of their negative impact (morbidity). It is important to point out that the production of risk indicators in the above methods reflect not only the complex interaction of factors that shape working conditions and worker with these factors, i.e. the factors of production and the final result of their impact are related as cause and effect. In terms of effective management of greatest interest production risk factors are just working conditions. Working environment is influenced by a number of concurrent factors, which have different material nature and characteristics of the effect on the organism, and the risk and expense of the employee's health is taking shape under different multivariate tiered intermittent exposure to low and medium intensity. In this regard, there is a need to

assess labor conditions, taking into account all factors and information of particular indicators of working conditions to the overall synthesis indicator. From available publications found that:

- Firstly, there is a set of criteria for generalized assessment of the state of working conditions;
- Secondly, all the proposed criteria, unfortunately, there is no conclusive evidence, as far as they are objective;
- Thirdly, poorly understood connection between the fact that better assesses the state of working conditions: professional or professionally due to morbidity.

Consequently, there is an urgent problem in the development of new indicators of an objective assessment of the working conditions, namely, the correlation of occupational disease or morbidity with temporary disability, which are devoted to the study conducted by us.

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ТҮЙІН

Бұл мақалада сапалы жұмыс ортасының жалпылама өлшемдерін бағалау көзқарасы әр түрлі әдістемелер мен нысандары отандық және шетелдік тәжірибесін талдайды. Қазіргі заманғы өнеркәсіптік кәсіпорындарының өндірістік персоналдың жарақат алу қаупі, әрбір артықшылықтары мен кемшіліктері анықталады. Осы талдаудың негізінде, міндеттерімен және тәуекел индикаторларының жаңа бағалауға негізделген еңбек қауіпсіздігі алдын алу басқарудың проблемасын шешу жолдарын анықтау.

РЕЗЮМЕ

В настоящей статье анализируется отечественный и зарубежный опыт различных методологий и форм подхода к оценке обобщенных критериев качества рабочей среды, рисков травматизма производственного персонала современных промышленных предприятий, выявляются достоинства и недостатки каждого из них. На основе данного анализа формулируются цели и определяются пути решения задачи по управлению профилактикой производственной безопасности на основе новых оценочных показателей риска.