

Methodological Features of the Management of Modern Labour Protection in the Construction

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Abstract. In the recent ten years, there has been a steady decline in industrial injuries and occupational diseases in the global economy. At the same time, against the background of favorable statistics on accidents, an increase in the overall incidence is observed, which are called «work related diseases». By decision of the Government of the Russian Federation to improve the production environment should ensure the reform of the management system of labour protection, focused on the prevention of the manifestation of dangerous and harmful factors. In this article there is analyse of the methodological aspects of occupational risk management, which imply a continuous and consistent cycle of activity from four stages, characterized as «the Deming-Shewhart cycle».

1. Introduction

This research is aimed at studying the methodological problems of the management of modern labour protection in the construction. Since the appearance of the first normative legal acts on labour protection, which were adopted in Germany more than 150 years ago, the labour safety system has been constantly improved, its goals and objectives have been clarified, and new methods and organizational forms have been used. Thanks to the joint efforts of government agencies, employers, labour collectives, public organizations represented by trade unions and the activities of the International Labour Organization (ILO), working conditions have improved significantly, comfort has increased, and the overall production environment has improved. As a result of the implemented measures, a steady decline in accidents and occupational diseases occurs, the number of disabled and fatal outcomes decreases.

However, simultaneously with a decrease in occupational morbidity and occupational injuries at industrial enterprises, the overall incidence began to increase progressively. Currently, non-specific for the reasons and conditions of occurrence of the disease, in the appearance and development of which the contributing mechanism or risk factor are the conditions of labour activity of people, take the leading positions in the structure of health disorders of workers. Such diseases are called “Work related diseases” (WRD). In the most cases, these are common diseases, to which the World Health Organization (WHO) refers to the following groups of diseases:

- diseases of the cardiovascular system: arterial hypertension, coronary heart disease, etc.;
- psychogenic diseases and mental disorders;
- respiratory diseases (bronchial asthma, bronchitis, cancer, etc.);
- diseases of the musculoskeletal system (pain in the spine, joints);



- violation of reproductive function.

This problem has acquired particular relevance in modern conditions. Occupational diseases do not belong to occupational diseases, while their number tends to increase with increasing length of service. It has been established that cases of loss of ability to work from WRD exceed the corresponding number of diseases in those occupational groups that do not come into contact with harmful and dangerous factors. The variety of effects on the human body of toxic substances and allergens, various physical factors, the intensification of labour leads to the transformation of existing occupational diseases and expands the range of production-related pathology. Difficulties in solving this problem are associated with the need to clearly differentiate between occupational diseases, which are an insured event and require compensation for damage to health. Production-related diseases are not, and, therefore, economic compensation for damage to the victim is not made.

The main characteristic of the multifactor production impact is the presence in the process of work of hazards and hazards of various nature and intensity, as a rule - at the level of permissible working conditions (class 2) or harmful low intensity (class 3.1). In accordance with Russian Federal Law no. 426 "On special assessment of working conditions", class 2 of working conditions means such a level of harmful and dangerous factors that do not exceed the hygienic standards and which allows the body to restore its functional state by the beginning of the next working day (shifts). Class 3.1 (hazardous working conditions of the first degree) includes such a workplace for which the restoration of an altered functional state of an employee's body occurs, as a rule, over a longer period than before the next working day (shift).

According to ILO estimates, the annual number of work-related diseases without a fatal outcome is 160 million people. And the annual mortality rate in 15 countries of the European Union is 120 thousand deaths due to the WRD, compared with 6 thousand from fatal industrial accidents. According to the ILO, there are about 100 cases of accidents due to fatal injuries in the world. Thus, the hidden risk in the loss of ability to work, in the interpretation of the ILO and WHO, is caused precisely by production-related diseases and is dominant.

2. Methodology

2.1. Total economic losses from industrial diseases and injuries

The Government of the Russian Federation in October 2011 adopted a resolution on measures to improve working conditions, preserve the lives and health of workers. The document noted that the country recorded a high level of industrial injuries, professional and production-related diseases, several times higher than in developed countries, because of unfavorable working conditions, the working time fund is significantly lost.

The government estimated the country's total economic losses from industrial diseases and injuries at 4.3% of GDP or 1.94 trillion Russian rubles, which exceeded the defense expenditures of the Russian Federation in those years. At the same time, the loss of the working time fund due to unfavorable working conditions was estimated at 1.48 trillion Russian rubles (76% of total losses), payments of the Pension Fund of the Russian Federation for early retirement pensions for work in hazardous conditions of labour were determined at 300 billion Russian rubles (15% of total losses), payments by the Social Insurance Fund for insurance provisions in connection with accidents and occupational diseases at work amounted to 159 billion Russian rubles (8% of total losses) [1]. Thus, the greatest losses of the enterprise are from labour losses due to diseases of a general nature, i.e. from production-related diseases caused by adverse working conditions.

The main problem of the negative situation with working conditions, in the opinion of the Government of the Russian Federation, is the ineffective labour protection management system, which existed in Soviet times, but which largely continues to function. It was recognized that in modern market

economy conditions it does not reduce injuries and morbidity, does not stimulate employers to improve working conditions, is not focused on preventing the manifestation of dangerous and harmful production factors, but on eliminating the consequences of occupational injuries and occupational diseases, on paying compensation to staff for work in hazardous conditions. In this regard, the Government of the Russian Federation has begun to implement measures for the transition from a compensatory model of occupational safety to a modern model based on the management of occupational risks. The new model of labour protection should allow to move away from the practice of responding to the already occurring facts of injuries or various diseases to the mechanism for developing and implementing preventive measures to prevent accidents, to preserve the health of personnel, which can ensure labour longevity [1].

2.2. The management system of organization as a complex mechanism

Any activity in the sphere of material production requires the expenditure of certain efforts aimed at ensuring its working state at the present time and in the longer term. The management system of organization is a complex mechanism using different methods and means of influencing the technical object under control and the working personnel. Management of professional risks involves a continuous cycle of activities in the sequential implementation of a set of procedures to identify and recognize negative factors of the working environment, develop measures to reduce or eliminate them, implement these measures, monitor the results and, if necessary, on corrective action. Such activity is an important part of the labour protection management system, which, in turn, should be integrated into the overall management system of any organization [2].

The famous American scientist W.E. Deming (1900 - 1993), conducting research in the field of quality management of products and services, came to the conclusion that the effectiveness of an organization's success by 94% depends on the effectiveness of the production management system and only 6% of direct actions by the artists themselves [3]. Optimization of the management system is achieved by continuous improvement of the activities of top and middle management, and the production itself is perceived as a whole system, and not as separate elements of it, which may seem incomprehensible or paradoxical in a single state.

The activity of any organization is associated with risk, therefore risk management, or risk management, must be used in all business processes. Thus, the procedures for assessing occupational risks are recommended as an initial stage in the formation of approaches to managing safety and protecting the health of workers, as well as building an occupational safety system in enterprises. Since 1989, when the European Union adopted the Framework Directive "On the introduction of measures that co-operate with improvements in the safety and health of workers at work" risk assessment has become the cornerstone of the European approach to occupational safety and health. In the 2011, the Federal Law of the Russian Federation introduced in Article 209 of the Labour Code of the Russian Federation amendments and additions relating to the definition of the concepts "professional risk" and "professional risk management", as well as the national standard GOST 12.0.010-2009 "SSBT. Labour protection management systems. Hazard identification and risk assessment" [4].

3. Results and discussion

The content of the new approach to ensuring occupational safety on the basis of occupational risk management is that the subject of practical actions should be both the events of damage to health and potential, not yet manifested occupational hazards, which are implicitly hidden and must be recognized beforehand. evaluate and minimize or eliminate. Practice shows that occupational hazards and hazards, which are not explicit, constitute a more significant array of threats than the incidents that have manifested themselves, and their recognition, assessment and elimination have a more significant preventive effect than responding to already occurring facts of damage to health. In addition, direct control of the parameters of the production process, which is carried out in its course in continuous

mode, is more effective than monitoring the results of the same process, performed only at the last stage of the event.

One of the important methodological features of the modern model of labour protection is a change in ideas about the nature of the origin of the production incident. In the framework of traditional approaches, the causes of damage to the health of employees are the most often recognized subjective reasons due to their violation of labour protection requirements. At the worker-executive level, such a version has the right to exist, but for the production manager, it does not provide an opportunity to effectively carry out preventive measures, assess, record and manage professional risks.

The ideology of today's production safety and health management system is that the main causes of accidents and occupational diseases are objective reasons, namely, the presence of a certain level of occupational hazards and hazards in each workplace. When hazards and hazards appear, they cause damage to a worker of varying degrees of severity, including loss of ability to work. The more hazards and hazards in production, the more accidents, professional and work-related diseases, as a rule, occur there [5].

Dangerous and harmful production factors can be in two different states - explicitly or hidden or implicitly. The obvious type of finding includes those dangers and hazards that manifested themselves, caused appropriate damage to human health, and in the process of investigating the incident, negative factors were documented and thus legalized. The degree of damage to the employee - light, moderate or severe - should not be taken into account in the procedure for registering a particular hazard or hazard. What is important is the fact of the manifestation of production hazards and hazards, and not the magnitude of the negative effect of their impact.

Those occupational hazards and hazards that are present in the labour process, but have not yet manifested themselves, externally did not affect the human body and, accordingly, did not cause its damage, are classified as dangerous and harmful factors that are in a hidden, implicit state. They pose a particular threat to labour safety due to the fact that, firstly, they are much greater than the dangers of the already manifested and harmful to the health of the employee, secondly, they are in an invisible, non-obvious state and they must be somehow difficult ways to identify and, thirdly, their potential impact on personnel may have more unexpected data and the most unpredictable consequences [5].

The implementation of a professional risk management methodology radically changes the approaches to assessing the state of the workplace. In the traditional model of labour protection, the working conditions of a person were determined by comparing the parameters of the production environment with the permissible indicators established by regulatory documents. This is the so-called centralized regulatory regulation of working conditions, based on the requirements of state regulations. The existing procedure gave the federal authorities the monopoly right to establish what should be considered a dangerous phenomenon or process and what should not be considered dangerous. In the event that the workplace was declared dangerous or harmful, the state established benefits and compensation for workers in harmful working conditions.

The introduction of a professional risk management system means a transition from regulatory state regulation from above to assessing the magnitude of risk in those places and areas where they arise and exist, i.e. directly in the production team. Today, in practice, the concept of "acceptable risk" is used, i.e. risk, the level of which is recognized as acceptable by state institutions, as well as by the production community, public organizations and directly working teams. The new order assumes that most of the powers and responsibilities for the state of working conditions from state structures will be transferred to employers and subjects of the Russian Federation. The establishment of risk acceptable, acceptable or unacceptable is not carried out by the regulatory regulation from above, but by the employer on the

basis of the technical and economic possibilities of the enterprise. Decentralization of management in the field of industrial safety increases the responsibility of managers for occupational safety, reduces the prerequisites for the formal implementation of state labour protection requirements, it largely reflects the market economy and corresponds to the nature of entrepreneurial activity as the risky activity [6]. Three important points are characteristic features of a professional risk management system. First, management activities are a cyclical sequence of performing interrelated practical actions, known as the “Deming-Shewhart cycle” or as the PDCA cycle (figure 1). The content of the cycle includes a set of procedures, divided into several stages: Planning (plan) - Implementation (do) - Examining the result (check) - Action (act). The cycle of measures to improve working conditions has a circular character, so the last stage is not the final action of the cycle, after its completion new tasks are set to reduce the level of occupational hazards. Thus, the PDCA cycle is aimed at a constant desire to improve working conditions, to consistently systematic work to reduce the value of occupational risk.

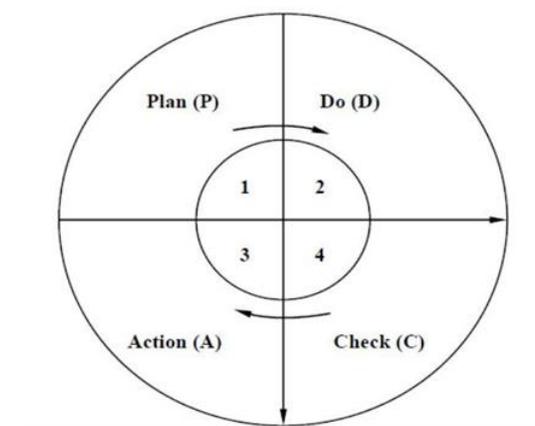


Figure 1. Scheme of the Deming-Shewhart cycle.

Secondly, the consistent implementation of identical cyclical procedures implements in solving management problems the so-called “process approach”, which should be carried out continuously, thereby creating conditions for the continuous improvement of the labour protection management system. And, thirdly, upon completion of the work of the last stage, a new cycle of the same practical actions should be started at the same workplaces, but with new goals and objectives for reducing the risks that emerged from the analysis of the last stage.

In general, the PDCA methodology is a kind of algorithm for the actions of the management team to achieve the planned goals in the field of labour protection. The process includes the following steps:

1. Planning (plan). In accordance with the organization's policy in the field of labour protection, the objectives of future actions are established, and a list of necessary measures is developed for them with an indication of the timeframe and responsible officials. The objectives of the work are identified according to the results of the analysis of the actual state of working conditions, carried out on the basis of the obtained data on the identification and assessment of occupational risks.

2. Implementation (do). The plan of measures to achieve the objectives of the policy in the field of labour protection contains deadlines and responsible for implementation. A feature of the risk management methodology is that the responsibility for the implementation of risk mitigation measures must be handled by the leading person who creates these risks. For the employee, the risks are created by the employer and the immediate supervisor of the production site, i.e. the person who provides him with a workplace, an instrument, ensures adequate sanitary and hygienic conditions, etc. Linear management personnel using the labour protection service, which does not full, but coordinates and

consults the other services, implements measures in the order in which the risks were ranked by importance [7].

3. Examination of the result (check). Stage of the cycle at which the implementation of the work of the 2nd stage is monitored. It measures processes to determine their relevance to the objectives of the program and the organization's labour protection policy. An assessment of the effectiveness of the measures taken is given, the results of the implementation are analysed, the shortcomings of the work program or the shortcomings of its implementation are identified. Control actions can initiate adjustments to both the work program and changes in the formulation of the objectives of management procedures. Promising is the development of internal standards of the organization, setting the so-called "technically achievable standards", more secure than state standards.

4. Action (act). In the Deming-Shewhart cycle, this stage refers to the activities of the company's top management, to the implementation of management functions, in contrast to the first three stages, characterized as the execution of planned activities. The employer, having the highest authority in the enterprise, on the basis of a comprehensive analysis should evaluate the first cycle of the process approach and, if necessary, make adjustments to work plans, declared goals to improve working conditions, as well as formulate new tasks and set new goals to reduce risks to be achieved when implementing actions in the next PDCA cycle.

The employer is a key element in a new management system in an enterprise, not only because it performs the functions of the first head, but also because the current legislation of the Russian Federation has overall responsibility for organizing work to ensure the required level of labour protection on it. In the traditional labour protection management system, these duties were eroded and not sufficiently personified, the labour protection engineer and the corresponding service of the enterprise carried out the main work on the prevention of occupational injuries and occupational diseases, and was supervised by the chief engineer.

In management theory, the principle of «Communicating vessel » is used, which suggests that the effectiveness of management decisions depends on how much the level of responsibility of the employee corresponds to the level of his capabilities or authority (Figure 2). The employer has the highest authority in the organization, he manages financial, material, human and other resources, so he has the opportunity within the existing authority to most successfully solve the most complex tasks, including ensuring comfort and safety of workplaces. Bearing personal responsibility for the general state of safety in the enterprise, the employer delegates some of its powers to the lower management levels, whose managers are responsible for working conditions at the production sites under their jurisdiction. Thus, the first head organizes the work on the management of labour protection in the organization and, secondly, ensures the safe work of his subordinates by creating appropriate working conditions.

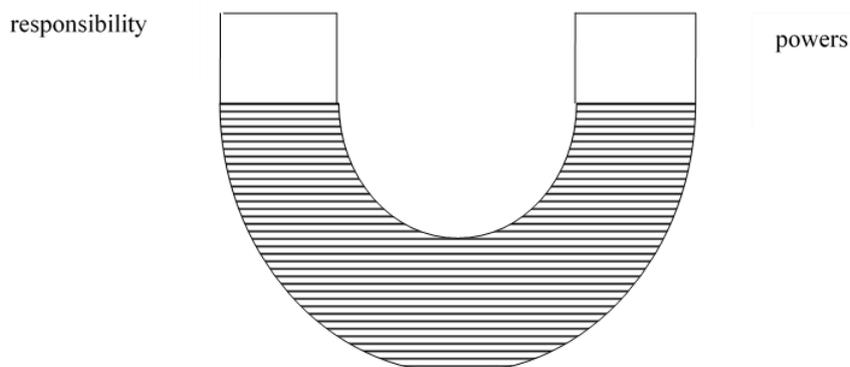


Figure 2. The «Communicating vessel» in the management theory.

The chief assistant of the employer in the implementation of their tasks is an occupational safety specialist. In accordance with the nature of the activities, it is not part of the technological management system of the enterprise and does not have authority over any production site. In contrast to the first manager, the labour protection specialist has limited powers, he is not able to give orders to managerial personnel or manage financial resources in an orderly manner. The labour protection specialist performs essentially the functions of a headquarters employee - he as an assistant and responsible consultant in the management recommends, informs, organizes and coordinates work on occupational safety. This status does not reduce the authority of the labour protection specialist; on the contrary, it places increased demands on his competence, professionalism, and human qualities [7-10].

4. Conclusions

Industrial injuries, occupational and occupational diseases are a serious socio-economic problem for each state. The damage to health that the production process receives is able-bodied and, therefore, the most active part of the population, negatively affects the preservation of the country's human resources, the decrease in life expectancy, and the worsening demographic situation. At the same time, all four sides of the accident or illness that occurred - the injured worker, the employer, the society and the state - incur significant direct and indirect economic losses.

Labour protection does not begin at the machine, not in the workplace. To a much greater extent, occupational safety, like all aspects of production, is laid down in decisions of officials who have a corresponding worldview and implement the modern system of occupational safety and health management. It is expressed in identifying and recognizing dangerous and harmful production factors, analysing and assessing occupational risks, developing organizational and technical solutions for minimizing the identified risks, and in implementing the planned measures with wide participation of the entire workforce. The new model of labour protection management should be an effective mechanism to ensure safe and comfortable working conditions, preserving the employee's proper working capacity throughout his work experience [11-15].

The task that has to be most often solved in the process of designing the organization of repair and construction production is the formation and calculation of irregular streams with unequal sizes of private work fronts. This is due to the heterogeneity of residential buildings undergoing repairs, as well as different volumes of work on the same grips, due to different technical conditions of the same structures, elements, systems in different parts of the buildings being repaired. The spatial parameters of the stream during the overhaul of buildings almost always determine its irregularity [16-20].

This analysis allows us to argue that in the repair and construction industry the main method of organizing work will be a specialized stream, the products of which are the same type of structural elements, or the same types of work. At the same time, the more buildings are simultaneously under repair, the more efficient and long-term private streams will be, which once again confirms the advisability of overhauling multi-apartment residential buildings by the group method.

References

- [1] T. A. Golikova, "On measures aimed at improving working conditions, preserving life and health of employees. Report on the meeting of the Government of the Russian Federation on October 27, 2011," *Occupational safety and health in construction*, no. 1, pp. 7-11, 2012.
- [2] GOST 12.0.230 – 2007, *SSBT. Occupational safety management systems. General regulations*, Moscow, Standartinform, 2007.
- [3] A. G. Fedorets, "Management of industrial safety and risk assessment," Collection of articles - "IBT", 2012.

- [4] GOST R 12.0.010-2009, *SSBT. Occupational safety management systems. Definition hazards and risk assessment*. Moscow, Standartinform, 2011.
- [5] E. B. Sugak, "The nature of occupational injuries in the aspect of managing professional risks," *Life safety*, no. 7, pp. 3-7, 2015.
- [6] A.V. Moskvichev, N.I. Simonova, S. V. Vikhrov, and V. V. Ivanov, "The system of labour protection based on the concept of occupational risk management," *Occupational safety and safety in construction*, no. 5, pp. 56-60, 2016.
- [7] E. B. Sugak, "On some of the official duties of security specialists Labour in Germany," *Man and work*, no. 10, pp. 48-51, 2013.
- [8] GOST R 54934 – 2012, *Occupational safety and health management systems*, Moscow, Standartinform, 2012.
- [9] A. Fedorets, *Methodical bases of quantitative estimation of production - Energy security in documents and facts*, no. 2, pp. 10-16, 2008.
- [10] E. B. Sugak, "On the modern model of labour protection," *Sb. Theses of Int. scientific conference "Integration, partnership and innovations in building science and education,"* Moscow, MSUCE, pp.185-186, 2013.
- [11] E. B. Sugak, "Methodological and organizational problems of professional risk management in construction," *MATEC Web of Conferences*, vol. 196, 04056, 2018.
- [12] E. B. Sugak, "Occupational Risks Management as a Basis of Industrial Injuries and Occupational Disease Prevention," *IOP Conference Series: Materials Science and Engineering*, vol. 365, 062038, 2018.
- [13] R. A. Litvinov, "Formation of OSH management systems. Tendencies at the national level," *Occupational health and safety at construction*, no. 4, pp. 12-18, 2013.
- [14] G. I. Tikhonova, A. N. Churanova, and T. Yu. Gorchakova, "Occupational risk in terms of industrial injuries in Russia," *Occupational medicine and industrial ecology*, no. 4, pp. 9-14, 2012.
- [15] E. G. Sugak, "Social Partnership," *Life Safety*, no. 6, pp. 6-10, 2016.
- [16] H. W. Heinrich, *Industrial accident prevention; a scientific approach*, 1959.
- [17] *The Labor Code of the Russian Federation*, as amended on December 30, 2015.
- [18] *A manual for monitoring working conditions in the workplace in industry*, Elmer - Helsinki System - Finnish Institute of Occupational Health, Occupational Safety and Health Administration under the Ministry of Social Affairs and Health of Finland, 2000.
- [19] M. Murtonen, "Risk assessment in the workplace - A practical guide," *ILO Subregional Office for Eastern Europe and Central Asia*, 2007.
- [20] *Guidance on OSH management systems. (ILO-OSH 2001) / (ILO-OSH 2001)*. Geneva, International Labor Office, 2003.