Reducing the Level of Injury through the Management of Professional Stress

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Abstract. The article characterizes the importance of occupational risk assessment in order to reduce injuries. The study shows that the level of professional stress of employees influences the magnitude of occupational risk. A study was conducted to assess the professional stress of workers according to the method of K. Weisman. The influence of the factors of a healthy lifestyle and the "work-family conflict" on the level of professional stress in the engineering industry has been confirmed. Authors propose and implement actions to improve the stress tolerance of workers and reduce the level of professional stress. The study conducted confirms the effectiveness of the implemented actions to reduce the level of occupational risks in the organization.

1. Introduction

Today, the development of industry has reached a large scale, both at the state and at the world level. Every day the pace of production increases. This contributes to the expansion of the production process, updating and increasing the number of production equipment and machinery. For their service, personnel are needed who monitor their technical condition, as well as the quantity and quality of their products. The increase in staff in the organization leads to the need for additional efforts to maintain and improve the state of labor protection and production safety.

Along with this, organizations have jobs in which working conditions do not meet regulatory requirements. This has an adverse effect on the health of workers. As a result of exposure to workers of harmful and dangerous production factors, the level of injury increases, and, consequently, increases the level of occupational risk.

Note that each of the causes of industrial injuries is directly related to occupational risk. Thus, reducing this type of risk - reduces the level of injury. The sources of occupational risk include factors of the working environment and the labor process. It is also influenced by various personal factors - psychoemotional state, relationships in the family, society and team, health [1], which may be one of the causes of professional stress.

Scientists have identified the problem of stress in the last century, and by now its importance has only increased. The World Health Organization (WHO) notes that more than half of employees in industrialized countries suffer from professional stress [2]. Along with this, at the World Health Assembly, which was held in 2019 in Geneva, burnout syndrome was officially recognized as a disease: “Burn-out is a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed”. Therefore, the inclusion of burnout syndrome with code QD85 in the
ICD-11 (International Classification of Diseases 11 revision) [3] is the basis for observation by a specialist and receiving medical care. The study showed [4] that professional stress in 37% is the cause of accidents and injuries at work. However, according to the author [5], the human factor, which is directly affected by the level of professional stress, is one of the main causes of an accident.

This information convincingly confirms the need to study stress in the workplace and identify factors that adversely affect the psycho-physiological state of workers. Search and implementation of various activities will improve the stress resistance of workers and reduce the negative impact of these factors. According to a study [6], workers are more susceptible to various diseases that are in a state of heightened stress or experienced stressful situations earlier.

2. Methods
Many different methods are used to assess the level of occupational risk. In most cases, they have one drawback - they do not take into account the professional stress of workers. In this regard, his "hidden" area is not subject to consideration when assessing occupational risk. It should be noted that currently there is an active automation of production processes. This leads to the fact that most of the working time, employees watch the technological process on the monitor screens, i.e. perform the work of operators. Consequently, this contributes to the increase in the intensity of labor of workers. It is one of the determining factors that has a direct negative impact on the level of professional stress of employees. In this regard, there is a need to include in the assessment of occupational risk techniques that allow to assess the level of professional stress.

We conducted a study to assess the level of professional stress in a machine-building organization. We used the methodology for assessing the professional stress of K. Vaisman [7]. This method consists in conducting a survey of employees and analyzing the results of their responses. It allows you to get results in a short time and use them to manage occupational risks.

This survey involved 300 respondents from among the staff of the organization. For the study were selected employees of various specialties. This made it possible to obtain more objective data on the level of professional stress of employees at various workplaces. The result of the questionnaire processing is presented in Figure 1.

![Figure 1. Assessment of professional stress.](image)

Analysis of the results showed that the majority of workers are at medium and high levels of production stress. According to a study [8], professional stress has a direct impact on the likelihood of an accident by a factor of 0.47 for workers who have previously been injured or are in an emergency. The authors state [8] that professional stressors reduce concentration of attention, distract attention, contribute to memory deterioration, affect fluctuations in work and reduce the ability to make decisions. Along with this, in the study of H. Singh and D. E. Conroy [1] it was noted that in 70% of accidents a positive relationship was found between increased levels of stress and injury. In this regard, the authors [1] argue that stress increases the risk of injury. Consequently, the identified level of professional stress contributes to an increased risk of injury in the organization. Thus, to manage
injuries, it is necessary to reduce the level of professional stress and increase the stress resistance of workers.

The level of professional stress, as well as the magnitude of occupational risk, is the sum of the combined effects of various factors. Among them are the production factors of the labor process, individual and social [8]. Consequently, reducing the negative impact of each of them will help reduce the level of injury. The work [8] presents individual and social factors that have a direct impact on the level of professional stress. Among them, one of the main ones is “general health condition”. The coefficient of influence of this factor is 0.37. This is confirmed by A. J. Day et al. [9], they noted a high correlation between health and professional stress. Consequently, the higher the physical and psychological health of a person, the higher his stress resistance. It should be noted that the importance of maintaining the health of workers and motivating them to a healthy lifestyle is one of the priorities in labor protection at the state level. This is confirmed by the approved Decree of the Government of the Russian Federation [10] which outlines the tasks for holding the contest “The best health management systems for workers in production”; analyzing and disseminating best practices for promoting healthy lifestyles in work teams, as well as developing and implementing corporate health promotion programs.

Along with this, the authors of [11] found a favorable effect of sport on reducing stress and increasing stress tolerance. According to the presented results, regular jogging has a beneficial effect on a person's physical and psycho-physiological health. This helps to improve health, relieve psychological stress and increase stress resistance [12]. The authors [13] identified the reason for the positive relationship between exercise and stress resistance. Physical exercise increases the level of galanin neuropeptide in the brain, which contributes to the protection of neural connections from the destructive effects of stress.

Also, one of the beneficial methods for relieving mental stress is swimming and one of the most ancient philosophies is yoga [14]. Swimming is a popular and effective way of dealing with stress. When swimming, the muscles relax, which contributes to both stress relief and relaxation. The advantage of yoga is that during the process of training, muscle tension is relieved, and their elasticity increases. It helps the muscles to relax more easily, gives soothing energy, improves mood. This helps to increase efficiency, helps to increase the body's resistance to any stress, as well as to establish internal calmness and confidence.

Along with this, it is worth noting the following factor that has a direct impact on the magnitude of professional stress - “work-family conflict”. In the works of M. Malakoutikhah et al. [15], T. D. Smith and D. M. DeJoy [16], the authors claim that it has a significant effect on stress, which contributes to an increase in occupational injuries. In this regard, among the effective methods of improving the stress tolerance of workers and reducing their level of professional stress, it is worth noting the holding of lectures and seminars for workers and specialists according to the “method of positive motivation for a healthy lifestyle” [17]. These activities include questions about the causes of problems in the relationship between relatives, loved ones, employees and superiors and options for solving them, the importance of a healthy lifestyle, giving up bad habits, adjusting nutrition and daily routine, as well as topics related to self-awareness and moral development of the personality.

3. Results
To reduce the factor of professional stress “work-family conflict”, lectures and trainings were organized in the organization in accordance with the “method of positive motivation for a healthy lifestyle” of employees. It also served as the first stage in the formation of a management system for the protection of workers' health at work and the creation of health promotion programs. For the implementation of this event, employees of the All-Russian public organization "Common cause" were invited, in order to use their program “Healthy Russia - a common cause” [18]. In order to increase stress tolerance and reduce the level of professional stress, employees are provided with an additional opportunity for sports. The organization provided discounts for training in the pool, fitness and yoga centers.
To analyze the effectiveness of these activities, applicants were divided into 2 groups. The first group included those workers who did not provide for holding events, as well as those who were not interested in the above recommendations. It includes 63 people. Accordingly, the second group consisted of 237 people who agreed to start working on themselves and go in for sports.

To analyze the effectiveness of these measures, after six months we conducted a repeated study to assess the level of professional stress (Table 1).

Table 1. The results of the re-study of the level of professional stress of workers.

| Stress level | Test group (300 people) | Group 1 (63 people) | Group 2 (237 people) |
|--------------|-------------------------|---------------------|----------------------|
| Low          | 44,3                    | 11,1                | 53,2                 |
| Medium       | 51,0                    | 71,4                | 45,5                 |
| High         | 4,7                     | 17,5                | 1,3                  |

According to the data obtained from the re-examination, changes in the level of professional stress were not observed in group 1 of workers. At the same time, among the employees of group 2, the measures taken had a beneficial effect on the reduction of the level of professional stress. A decrease in the high level of stress by 17.7% was recorded - 34 employees moved to the “medium” category, and 8 workers to the “low” category. Reducing the average level of stress by 26.2% - 82 employees moved to the “low” category. Thus, it has been established that, thanks to the measures taken, in the second group, 124 workers reduced the level of professional stress within 6 months. Considering that stress affects attention and mental health, which contributes to a decrease in efficiency [8] and an increase in the risk of an accident caused by the influence of the human factor [5]. Consequently, the risk of occupational injuries is reduced.

The results of reducing the level of professional stress in the second test group are presented in Figure 2.

4. Conclusions
As a result of the study, we found that the management of the professional stress of workers in organizations of the engineering industry plays an important role in reducing injuries. Conducting such events allows you to determine in which psycho-physiological state are employees. Consequently, this allows us to see where the probability of an accident occurring due to the appearance of errors related to the human factor is the highest. Thus, to protect the health of workers and reduce injuries, it is necessary to control and reduce the level of professional stress.

The study show that, the level of professional stress in the second group of workers was reduced by 52.3%. These results confirm the positive impact of the “method of positive motivation for a healthy lifestyle” for workers in the engineering industry and their agitation for playing sports. This made it possible not only to reduce the level of professional stress, but also to increase the stress tolerance of
workers, which contributes to a reduction in the level of injuries and a decrease in the organization’s costs associated with accidents and accidents. The impact of general health and the “work-family conflict” factor on the level of professional stress was confirmed.

During at first we implement a set of measures to stimulate employers and workers to improve working conditions and preserve the health of employees, as well as to motivate citizens to maintain a healthy lifestyle, recommended by the Government of the Russian Federation.

At the same time, we note that at present in organizations of the Russian Federation the level of occupational risk is not assessed. Managers are limited to data obtained as a result of a special assessment of working conditions. They do not provide information about the level of injury in the organization. According to a study previously conducted by the authors, this information is not enough to obtain reliable baseline data to assess the current levels of professional risks of hazardous production factors [19]. Consequently, this makes it difficult to obtain objective results in predicting injuries and accidents. It should be noted that when conducting a special assessment of working conditions there is no possibility of obtaining full source data to determine the level of professional stress of workers. Previously, they were evaluated in the study of factors of the production environment - the tension and severity of the labor process during the certification of workers in terms of working conditions [20]. In this regard, the assessment of the level of professional stress will complement the results of a special assessment of working conditions. This will provide more reliable data on the level of occupational risk in organizations related to professional stress and take preventive, scientifically based measures to reduce injuries in the organization by introducing additional measures and monitoring employee health.

5. References

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