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REDUCING OCCUPATIONAL RISK IN INDUSTRY BASED ON THE LABOR WEIGHT FACTOR

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Abstract:
The article presents the theory of risk and its role in ensuring occupational safety, the methodology for quantitative assessment of possible accidents, methods for determining risk. The concept of acceptable, permissible risk, the theory of risk management, and methods for preliminary analysis of risks are discussed.

Keywords: Theory, risk, quantitative assessment, concept, acceptable, methods, model, engineering, expert, social, survey.

Introduction

Risk theory in security is the scientific basis for assessing risks, analyzing their potential consequences, and developing optimal methods for ensuring security. This theory includes mathematical, statistical, and psychological aspects of risk management.

The main concepts of risk theory are as follows:

Risk is the probability of the occurrence of unknown consequences and their negative impact. "Risk = probability × severity of consequences" is considered an interconnected and interacting system.
Risk is divided into the following types:
• technical risk (imperfections in the operation of machines and processes);
• social risk (improper actions of workers);
• natural risk (such as earthquakes, water barriers)

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Risk assessment is of great importance and is carried out using the following methods:
Qualitative assessment: Evaluating the risk as "high", "medium", "low"
Quantitative assessment: Expressing the probability in numbers (for example: 0.1% risk)
In ensuring safety, identifying risks (listing hazardous processes; analyzing the causes of risks), assessing risks (calculating the probability and consequences of risks; creating a risk matrix), developing risk management strategies (acceptance (for low risks); redistribution (through insurance); retention (risk reduction measures); avoidance (stopping the hazardous process) are of great importance.

RESEARCH METHODS

The study used analytical, predictive, comparative and statistical analysis methods, as well as empirical methods: questionnaires, observation, test questions, interviews, open-ended ideas, and analysis of experimental test results.

RESULTS AND DISCUSSIONS

Risk theory allows you to foresee risks, helps to make an economically rational choice of measures and increases the effectiveness of disaster prevention
Risk theory takes into account not only calculations, but also the psychological attitude of a person to risk.
“Risk” is the frequency of occurrence, realization of a risk, that is, a quantitative assessment criterion of risk.

Risk is the opposite of risk.
Risk is the frequency of occurrence of a risk, that is, a quantitative assessment criterion of risk.
Quantitative assessment is the ratio of the probability of occurrence of undesirable consequences occurring during a certain period of activity to the risk, consequence**.**

$$R_{ur} = \frac{n}{N};$$

where n is the number of workers killed in production per year;
N is the total number of workers.

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Before examining other aspects of risk, let's give a few examples

Example 1. If the number of workers in the country is 10 million people and about 2 thousand people die due to industrial accidents in 1 year, determine the risk of industrial fatalities?

$$R_{ur} = \frac{n}{N} = \frac{2^{*}10^{3}}{10^{*}10^{6}} = 2^{*}10^{4}$$

where n is the number of workers killed in production per year;
N is the total number of workers.

Example 2. Every year, about 2.38 thousand people die in the country due to various hazards, excluding natural deaths. Assuming that the population of the country is 24 million. people, determine the risk of death of the country's population due to various hazards?

$$R_{мам} = \frac{2{,}38^{*}10^{3}}{2{,}4^{*}10^{7}} = 10^{-4}$$

Risk, depending on the type of risk, is divided into personal and social types. Personal risk characterizes the risk directed at one person, and social (more precisely, group) risk characterizes the risk affecting a group of people.
When comparing risk during activity, that is, the risk of facing the risk and the work (benefit) performed as a result of the activity, many experts suggest using the financial measure of human life. Of course, this proposal is not supported by all specialists. However, if the question is asked "How much money should be spent to save a human life?", This proposal is considered correct. According to the results of research by some foreign scientists, the safety of human life can be estimated at from 650 thousand to 7 million US dollars.
The procedure for determining risk is considered very approximate and can be divided into the following four methods:

- engineering method. This method is based on static data, calculating the frequency of risks, probabilistic safety analysis, building a hazard tree, etc.;
- model. In this method, a model of dangerous and harmful factors affecting an individual, a group of people, etc. is created;
- expert, that is, the probability of various events occurring is determined based on the judgment and opinion of experienced specialists (experts).

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•social survey. In this case, the probability of events occurring is determined by knowing the opinion of the population.

The methods described above reflect different aspects of risk. Therefore, in practice, it is advisable to use these methods in a comprehensive manner.

The concept of acceptable (permissible) risk

Traditional safety techniques require a strict requirement, that is, each production process should be without a single accident, without damage, without injury. However, life shows that this concept (concept) is inadequate to the laws of the technosphere. Therefore, modern safety laws abandon the concept of absolute safety and put forward the concept of acceptable risk.

The concept of acceptable risk includes technical, economic, social and political aspects and is a compromise between the level of safety during operation and the possibility of achieving safety.

The economic possibilities of increasing the safety of technical systems may be unlimited, but excessive spending on ensuring safety can lead to harm in the social sphere, that is, for example, medical care may deteriorate. This means that with increasing costs, technical risk decreases, and social risk increases.

In some countries, the permissible level of risk is established by law. This amount can range from 10-8 to 10-6. In general, the maximum permissible level of risk for an ecosystem implies a loss of 5% of the biogeocenosis species in the system. At present, an acceptable, that is, permissible level of risk has not been adopted in our country. However, this concept is criticized and denied by some specialists. However, the actual level of risk is 2-3 times higher than the permissible level of risk. Therefore, the implementation of the acceptable concept of risk is one of the measures aimed at protecting humans from danger.

Risk management. One of the main tasks of life safety is to increase the level of safety as much as possible. This task can be achieved through activities in the following three areas:

1. Improving technical systems and facilities.
2. Training highly qualified specialists and personnel.
3. Eliminating emergency situations.

In accordance with the above, we can also divide risk management methods into 4 groups: technical, organizational, administrative and economic. If the improvement of technical systems and facilities is carried out through the

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technical method, personnel training and emergency response is carried out through organizational and administrative methods, then the economic method is carried out through measures such as insurance, payment of monetary "compensation" (contribution) for damage, and various payments for dangerous conditions. Therefore, the basis of risk management is the comparison of the benefit obtained due to the reduction of risk, that is, the increase in the level of safety, as a result of additional costs. Risk management first of all requires the study and logical analysis of risk. The potential risk is studied on the basis of a certain sequence and is presented in the form of a diagram.

Stage 1 - Preliminary risk analysis.
a) identification of risk sources;
b) identification of elements of the system that cause this risk;
c) establishment of certain limits in the analysis, i.e. separation of risks that cannot be studied.

Stage 2 - Determination of the sequence of occurrence of risks, construction of an “event and risk tree”.

Stage 3. Analysis of the consequence.
Stages 1 and 2 of the above-mentioned risk study sequence are carried out before the occurrence of an event (consequence), that is, the start of the activity process, and serve to ensure safety, while stage 3 is used to develop measures to ensure safety in the future.

CONCLUSION

In conclusion, the importance of risk is particularly important in ensuring safety, economic stability and strategic decision-making. The main reasons and effects of this can be listed as follows:

1. Scientific basis of risk management:

• Predictability: 70-80% of accidents can be prevented by analyzing risks (for example, according to OSHA).
• Optimal measures: correctly allocate resources by calculating the probability and severity of the risk.

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2. Socio-economic significance:

• Accident reduction: Risk assessment in construction or industry reduces injuries by 30-50%.

• Financial losses: Failure to take risks into account leads to losses of more than $ 170 billion per year (ILO data).

3. Psychological aspects:

• Reducing human error: Understanding the risk increases the awareness of workers (attention to safety information increased by 40%).

• Increasing responsibility: Displaying the risk in numbers increases the decision-making power of managers.

4. Role in legislation:

• Labor protection: In Uzbekistan, the Law "On Labor Protection" makes risk assessment mandatory.

• International standards: The ISO 31000 standard defines universal methods for risk management.

5. Practical significance:

• In artificial intelligence: Early detection of risk with 92% accuracy through AI.

• Insurance sector: Correct risk assessment reduces insurance payments by 15-25%.

For example, in 2022, risk assessment in the CRM system in the United Arab Emirates prevented $3 million in losses. Understanding risk not only reduces risks, but also allows for optimal use of resources, protecting human life, and increasing production efficiency.

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