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## **PROFESSIONAL RISK EVALUATION BY THE FAIN-KINNI METHOD**

*Abstract: The risk management process is the basis for creating a healthy and safe working environment. The risk can be caused by technogenic accidents, as well as occupational diseases and cause material damage. Risk assessment is a structured process that identifies ways to achieve goals, analyze the consequences and probabilities of events for making decisions about the need for risk treatment. This article describes one of the methods for risk assessment - Fain-Kinni method.*

*Keywords: technosphere safety, risk, probability, professional risk, assessment methods, risk assessment.*

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## **ОЦЕНКА ПРОФЕССИОНАЛЬНОГО РИСКА МЕТОДОМ ФАЙН-КИННИ**

*Аннотация: Процесс управления рисками является основой для создания здоровых и безопасных условий труда. Риск может быть вызван техногенными авариями, несчастными случаями, а также являться причиной профессиональных заболеваний и наносить материальные убытки. Оценка риска - это структурированный процесс, который определяет способы достижения целей, анализирует последствия и вероятности возникновения опасных событий для принятия решений о необходимости обработки риска. В данной статье рассмотрен один из методов оценки рисков – метод Файн-Кинни.*

*Ключевые слова: техносферная безопасность, риск, вероятность, профессиональный риск, методы оценки, оценка рисков.*

The development of the technosphere has led to the accumulation of large potential hazards - technogenic factors, the cumulative effect of which has become commensurate with action on the person of natural factors.

The emergence of the technosphere required the diversion of a part of human resources to the creation of a technical security system designed to ensure the protection of man from technogenic factors.

In recent years, steps have been taken in Russia to switch to the use of risk indicators in assessing the safety of industrial plants. Thus, along with the concept of “security”, the opposite concept of “risk” began to be used [1].

According to the dictionary reference of terms on ecology and conservationists, risk is the probability of adverse effects for environmental resources of any (intentional or accidental, gradual or catastrophic) anthropogenic changes in natural objects and factors, , as well as the likelihood of environmental degradation or its transition to an unstable state [2].

The term professional risk is used to describe the level of human security in the field of professional activity.

The professional risk is the probability of damagees (loss) to health or death as a result of the adverse influence of factors of the working environment and the labor process associated with the performance of duties under an employment contract and in a number of other cases established by law [3].

Professional risk can be presented in the form of three main components:

1) the risk of damage to health due to accidents at work of varying severity, which leads to the need to transfer to another job, temporary or permanent loss of professional disability, or death;

2) the risk of occupational diseases resulting from exposure to harmful and dangerous production factors, and the resulting temporary or permanent disability;

3) the hidden risk of damage to health by harmful factors of the working environment, severity, intensity of the labor process.

Professional risk assessment can occur using various methods and techniques. A set of methods is used for more accurate risk assessment sometimes. This is happening in order to more accurately calculate the risk and its impact on a person in the process of his work or life. All methods can be divided into three groups [4]:

- statistical methods;
- expert methods;

- calculated and analytical methods.

In more detail, an infinite number of specific methods and techniques belong to each group of methods. Based on GOST R ISO / IEC 31010-2011 Risk Management. Risk assessment methods [5].

Statistical are methods that are based on determining the probability of occurrence of certain risks or on studying risk statistics that have already occurred in similar situations.

They are able to provide the highest degree of risk assessment, but only with very careful monitoring and the availability of complete and correct information. Otherwise, statistical methods will not bring the expected results in the risk assessment.

The methods that are carried out by highly qualified specialists based on the collection, study, and synthesis of risk assessments are expert. The advantage of these methods is that they approach any field of activity.

But sometimes the universality of these methods is too low, so in many cases when a risk analysis is needed in a particular situation, the development of special techniques is required. The disadvantage of these methods is the high cost since, in order to attract experts with the necessary qualifications, high costs are required.

The last group of methods is the most widespread and simplest in execution - computational and analytical methods. These methods allow to assess risks in the absence of any statistics and to obtain a quantitative assessment. All methods of this group also refer to mathematical methods, the use of which usually leads to complete certainty [6].

There are many methods for assessing occupational risks. One of positively proved in practice is Fayn and Kinney's method which the main idea consists in the assessment of the individual risks of the certain worker defined as the probability of getting injured or a disease as a result of the existing danger.

This method is most widespread in foreign countries. Its advantage in simplicity and that it is based on the standard system principles has constant character, allows to plan and carry out monitoring of the revealed dangers and also to react quickly to the changing conditions of the production environment.

The main idea of the method of Fain-Kinni is to assess individual risks as the product of three components - the impact, probability and consequences of an event.

There is a degree of exposure varies from 0 - there is never exposure, to 10 - permanent exposure, in Fain-Kinni method. The probability varies from 0 - absolutely impossible, to 10 - it will happen. The consequences range from 1 - minimal (damage), to 100 - disaster.

In determining the degree of risk, all stages of work are considered: from the process of preparing for them to the stages of their implementation and completion (table 1, 2).

Table 1 - Quantitative assessment of risk components

<b><u>Points</u></b>	<b><u>Probability</u></b>
10	Most likely to happen
6	Very likely
3	Uncharacteristically, but it is possible
1	It is improbable
0,5	It is unlikely perhaps
0,2	It is almost impossible
0,1	It is actually impossible
<b><u>Points</u></b>	<b><u>Influence</u></b>
10	Constantly
6	Daily during the working day
3	Occasionally, weekly
2	Sometimes (monthly)
1	Seldom (annually)
0,5	Very seldom
<b><u>Points</u></b>	<b><u>Consequence</u></b>

100	Emergency situation, many victims
40	Destructions, there are victims
15	Serious consequences, there is a fatal case
7	Disability, severe injury
3	Cases of temporary disability
1	Slight injury, first aid is provided

Table 2 - Ball scale of professional risk assessment

Points	Risk	Preventive measures
> 400	Extra-high	It is necessary to stop immediately activity before elimination of danger or risk reduction
200-400	High	Acceptance of emergency measures on risk reduction is necessary
70-200	Considerable	It is necessary to plan and execute actions for risk reduction in a short time
20-70	Moderate	It is necessary to plan and execute actions for risk reduction
< 20	Small	Subject to research. It is necessary to control danger level

As a result, risks are classified into five groups: small; moderate; considerable; high; extra-high. The advantages of this method are simplicity in calculations and visibility. The disadvantage is the subjectivity in the assessment of probability.

Conclusion: The article describes one of the positively recommended in practice method of risk assessment, the idea of which is to assess the individual risks of an individual employee, defined as the probability of injury or illness as a result of the existing danger. Application of mark assessment of the specified parameters of professional risk on the basis of an appropriate rating scale allows obtaining a quantitative degree of risk, which in turn makes it possible to correctly respond to the risk and take appropriate measures to eliminate it.

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