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GENERAL ELEMENTS OF RISK MANAGEMENT

Jaroslava Kubáňová[1]

Risk management and analysis

Risk Management is defined as the purposeful and systematic decision-making process that can take into account engineering, economic, social, political and other factors in identifying, analyzing, assessing, evaluating, regulating and monitoring of potencial risks. [4]

According to the Slovak technical standard STN 01 0380 Risk Management of the main elements of risk management include: [Fig. 1]

1) Designation of connections
2) Identification of risks
3) Risk analysis
4) Risk assessment
5) Treatmen of risks

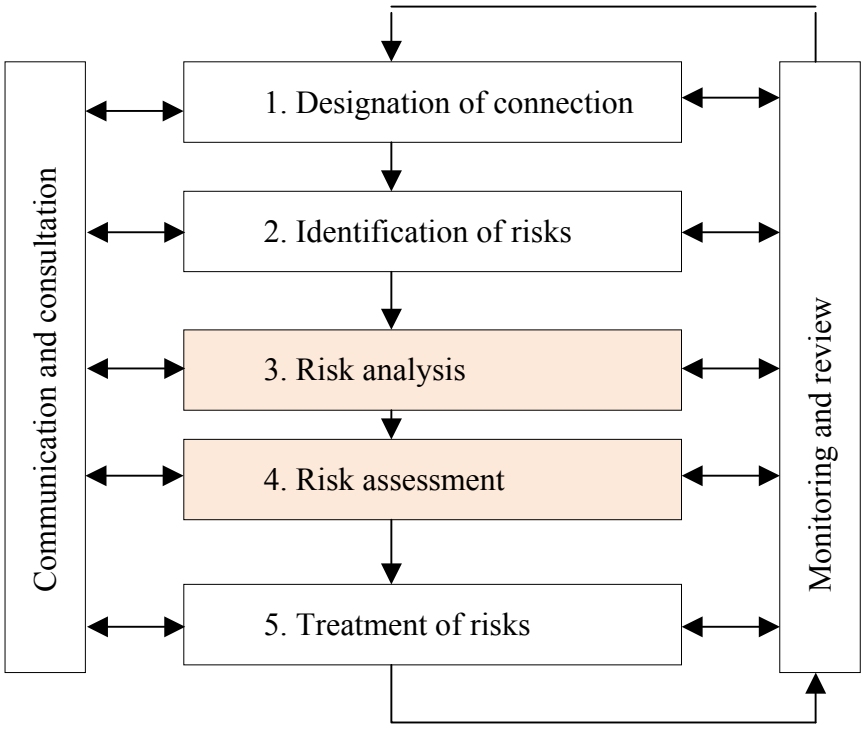

Figure 1 Block diagram of the process of risk management, [5]

[1] Ing. Jaroslava Kubáňová, PhD., University of Zilina, The Faculty of Operation and Economics of Transport and Communications, Department of Road and Urban Transport, jaroslava.kubanova@fpedas.uniza.sk

1) Designation of connections

Determining the organization has links to help find the key elements that help promote or restrict its ability to manage the risks it faces. It is necessary to understand the organization and its abilities, as well as the targets, objectives and strategies practiced to achieve them. This is especially important because:

a) Risk management is carried out in connection with the broader targets, objectives and strategy of the organization,

b) failure to achieve the targets of a particular organization or activity, whether a particular project under consideration is one set of risks that must be managed,

c) the policy of the organization and its targets help to define the criteria on which to decide whether the risk is or is not acceptable, and formulate the basis of optional measures.

2) Identification of risks

The step aims to identify the risks to be managed. Identification should include all risks, regardless of whether or not under the control of the organization. Identify risk getting your asking questions: "What can happen?" and "How and why this might happen?"

For identifying the risk can be used the method:

What if Analysis ...

- purpose of ensuring safety of the method What if Analysis is to identify hazardous conditions. With the typical questions that start with the traditional "What happens if ..." to identify the causes of failures and propose measures to increase security. Can not be ordered and any objection relating to safety and may be expressed as a question. Asking questions depends on experience and intuition of the expert team, which carried out the study. At meetings are strictly applied brainstorming. The method is very effective in a study drawn up by experienced professionals. [2]

After answering the question "What happens if ..." we get a list risks threatening society and which is summarized in checklist.

Checklist

- a simple tool for qualitative assessment of pre-defined activities, equipment, conditions and actions. Checklist generally comply with the minimum standards of safety and quality assessment in particular draws attention to the possible risks arising from the

operation of the system or which has already occurred. Same disadvantage may be a little complexity, but the advantage is clear structure. [1]

3) Risk analysis

The target of the analysis is to separate the acceptable low risks from high risk, and provide data that would help in risks assessing and handling. Risk analysis includes risk assessment of the sources, their consequences and estimate reliability with which these consequences occur. Risk is analyzed by combining estimates of consequences and their likelihood of occurrence and put into the context of existing control measures. [2]

The consequences and credibility are combined and creates a level of risk. Consequences and credibility of their occurrence can be estimated using statistical analysis and calculations. If there are any available historical data, may instead make a subjective estimate, which reflects the level of an individual or group belief that there is a particular event or outcome. To avoid the subjective opinion, it should be when analyzing the consequences of their credibility and use easily available information sources, such as:

- previous records,
- relevant experience,,
- practical training and experience,
- opinion of specialist and experts, etc.

Techniques include:

- structured interviews with experts in the area of interest,
- the use of expert group with a defferent focus,
- individual assessment using by questionnairs,
- use the computer or other modeling, etc.

For analysis and risk assessment is currently available a lot of methodologies and software tools that have their origin in various sectors of human activity. Under the circumstances, the analysis may be qualitative, semi-quantitative, quantitative, or combination thereof. Ranking of complexity and cost increases from qualitative, semi-quantitative to quantitative. In practice it is often possible uses qualitative analysis to obtain a general estimate of the level of risk. Later it may be necessary to carry out more specific quantitative analysis.

a) Qualitative analysis

Qualitative analysis is descriptive or narrative description of the size scale of the potential consequences of assurance that these effects occur. These scales can be adapted or modified according to circumstances, so for a variety of risks can use different descriptions. Qualitative analysis is used:

1) as initial monitoring activity intended to identify risks that require more detailed analysis,
2) where the level of risk does not justify the time and effort in detailed analysis,
3) where the figures are insufficient to carry out quantitative analysis.

b) Semi-quantitative analysis

In the semi-quantitative analysis are assigned values to the qualitative scales. Number assigned to the description may be no exact relationship to the actual size or the consequences of credibility. The target of this analysis is to establish detailed modalities for assigning priorities than what is usually achieved in qualitative analysis, but not to propose any real value risk of trying to quantitative analysis. Semi-quantitative analysis of risks may behave differently, especially when it comes to extreme impact or extreme reliability. Eg.:

Safety Audit

The searching for the procedure risky situations, including proposals for measures to improve safety forms are used a list of questions ready for the valuation of risk matrix. Questions are aimed to operators and other interested persons, and includes on-site inspection. The output is the search for weaknesses in the operation.

c) Quantitative analysis

Quantitative analysis used to estimate the likelihood and consequences of the numerical values obtained from data contained in various sources, eg. published literature, experiments, records, etc. The quality of analysis depends on the accuracy and completeness of the figures. Consequences can be expressed in terms of finances, technical or human criteria, or by any other related criteria. Credibility is usually expressed as the probability, frequency, or as a combination of occurrence and probability.

4) Risk assessment

It is part of risk management. It is a process in which they evaluated the risk compared with the chosen criterion and the decision taken by its negligence, accepted, tolerated or not accepted. [3] In other words, the process of determining the type and degree of risk due to

exposure to risk factor. Risk analysis and criteria with which to compare the risks in the evaluation, are based on the same basis. This means that qualitative evaluation involves a comparison of the qualitative level of risk with qualitative criteria, while the quantitative evaluation involves a comparison of the numeric value of risk criterion, which may reflect the specific number, such as mortality rate or financial value. The output of risk assessment is a list of risks, priorities for further processing. If the resulting risks fall within the category of low risk and acceptable risk can be accepted with minimal further attention. Little risk and acceptable risk should be monitored and reviewed periodically to ascertain that they remain affordable.

Among the risk assessment methodologies include:

- expert evaluation,
- professional practice standards,
- comparison of repeatability and effects (thresholds),
- comparison of individual risk,
- comparison of social risks (suitable for quantitative risk assessments for clearly comparable systems, eg. the choice of routes for transportation from point A to point B),
- effectiveness.

Risk is a measurable quantity and provides an objective estimate of the degree of risk levels, but its perception and assessment of its acceptability depends on the subjective characteristics of the risk assessor. [see Table 1]

Table 1

Table for risk assessment

Workplace	Date	Who evaluated
activity/ equipment/ workplace		
Dangers (what can cause damage)		
Threat (how damage may occur)		
Who may be threatened?		
What are the current measures?		
Probability that damage may occur 1 2 3 4	Consequence of possible damage 1 2 3 4 5 6	
RISK Multiplication.....	Verbal evaluation	
What measures should be taken?		
Who is responsible Term	When must be repeat the risk assessment	

Source [3]

The purpose of risk assessment is to analyze and evaluate the identified risks to determine whether they need to be treated. To illustrate the risks can be used diagrams or matrices. [Table 2] This matrix is an example in which the risk class assigned priorities created by the combination of their credibility and impact. Such tables must be adapted to the needs of a particular organization or a particular goal of risk assessment.

Table 2

Matrix of risks

Credibility	Consequences				
	1	2	3	4	5
A	H	H	E	E	E
B	M	H	H	E	E
C	L	M	H	E	E
D	L	L	M	H	E
E	L	L	M	H	H

Tabuľka prevzatá z publikácie [5]

Legenda: **E:** extreme risk; it requires immediate corrective action

H: high risk; it should be given to the attention of senior management

M: medium risk; it must be specified management responsibilities

L: low risk; it follows the usual procedures

5) Tretmant of risk

Treatment with risk involves identifying the range of optional measures for dealing with risk assessment, preparation of plans dealing with risks and their implementation. Optional measures that don´t exclude each other or may not be appropriate in all cases, these measures include:

a) avoidance of risk decision not to proceed with the activity likely to cause risk (where practical).

Avoiding risk may be inappropriate due to risk aversion, which results in:

1) the decision to avoid the risks or ignore them, regardless of the available information and costs associated with their treatment,

2) failure to address the risk,

3) maintaining critical solutions and/or decisions on other sites,

4) choice of optional measures because it represents a potentially lower risk, regardless of benefits, etc.

b) reduce the reliability of risk

Where credibility is viewed as a property that is used for the quantitative description of probability or frequency. Which means that in this action, we must strive to reduce the numerical probability of risk.

Activities aimed at reducing the credibility of such risks.:

- Investment management,
- Preventive maintenance,
- Inspection and control activities,
- Ensuring quality management in companies,
- Theoretical knowledge and practical experience of staff, etc.

c) limiting the consequences of risk

Result is actually a qualitative or quantitative, the result of an event that may be the loss, gain, injury, etc. So in our case, this means that if the risk occurs, it must reduce its impact on the level of activity.

d) transfer of risk

Reduce the impact and credibility can be described as risk management.

Risk management is the process of selection and application of control and corrective action, based not only on the Risk Assessment, but also to consider the political, social, economic and technical solutions and options to consider other influences. Risk management is based on an accepted fact that all the processes that take place in the system are random in nature. Therefore, considerable attention is devoted to study patterns of random events, their causes and effects. [3]

Elimination of risk is a process that results of it is the complete elimination of risk.

Risk reduction is a process that results is in reducing the risk of the tolerable limit (acceptable) risk. Process of reducing risks is very diverse, which is clearly dependent on the nature of a particular risk, the probability of crisis phenomenon, which can also result from its expected negative consequences [3]. Targeted risk reduction is therefore necessary to perform optimization of the cost of risk management.

Risk reduction takes place:

- By promoting an active anti-crisis policy

- Through the use of specific methods.

Approaches to risk reduction

Risk of business plans (or business at all) is not in stone, not entirely dependent on business entity, but this risk may be appropriate activities manager, respectively. entrepreneur to reduce or (more in exceptional cases) totally eliminated.

The activities of the entrepreneur, which are aimed at reducing the risk can be divided into two basic groups:

- Activities focused on weakening, respectively eliminate the causes of risk,
- Activities aimed at reducing the risk of negative impacts.

Activities focused on weakening, respectively. eliminate the causes of risk

This group can include those types of activities that would reduce the likelihood of risky situations with a negative impact on the effects of entrepreneurial projects and size of these impacts. These activities of business entities are focused on specific risk and prevention literature is sometimes referred to as offensive approaches, exemplified by the transfer of risk.

Activities aimed at reducing the risk of negative impacts

Within this group we include those activities that are aimed primarily at reducing the adverse impact of certain risk situations. Thus, there is not to influence the causes of their own risk, but that the effects of risk on the company have been reduced to some economically acceptable levels. These activities are in literature often referred to as ***defensive approaches*** and strategies. As an example of such a strategy can be given such. diversification.

Significant risk reduction approaches

1. Diversification

It lies in an effort to spread the risk to the widest base. The most common type of diversification is the expansion of business activities. However, it also has its disadvantages, on the one hand leads to a reduction of market risks, but on the other hand, however, does not benefit sufficiently from the effects resulting specialization of the company. Loss or reduction of this effect is thus a price to be paid for reducing the risk of business expansion.

The practical importance of reducing business risk by diversifying confirmed by the experience of economic practice. Major capital strong companies that can be broadly diversified, come to the existential problems less frequently than small firms.

2. Risk - sharing

It is a way of reducing the risk at which this risk is shared between the two, respectively more parties who are jointly involved in implementing a business project or similar activity or intent. Risk-sharing can be achieved in several ways, for example. obtaining non-reimbursable grants, establishment of joint ventures, etc.

3. Risk transfer

Another important and frequently used way of reducing business risk is the transfer (the transfer) to other entities (suppliers, customers, etc.) [4] The most important means of transfer of risk include:

- Concluding long-term contracts to carry traffic for the previously agreed terms. This method of risk reduction can not only be used for such clients as transport, who are economically weaker, or on such an upswing when the buyer has final say on the market,
- Car rental (leasing). This reduces the financial risks of the entrepreneur (recipient of the lease) of ownership of the vehicle (as a result of the moral obsolescence, low utilization, etc.) and transferred to the lessor. The advantage is the reduction in claims for initial capital (distribution costs over a longer period of time).
- Insurance as a way of reducing risk is based on the principle of grouping a large number of individual risks, which can increase the ability of prediction of risk situations and losses associated with them,
- In case of unacceptable risk when the business projects that could, if his failure to lead to significant distortions of company financial stability approach is used to avoid risk.

e) Risk retention

After reducing or transferring risks there may be residual risks that are retained. It is therefore necessary to develop plans for consequence management of these risks, if there are, including the identification of their means of financing. In Fig. 2 we can see a graphical representation of the cost of risk-reducing measures.

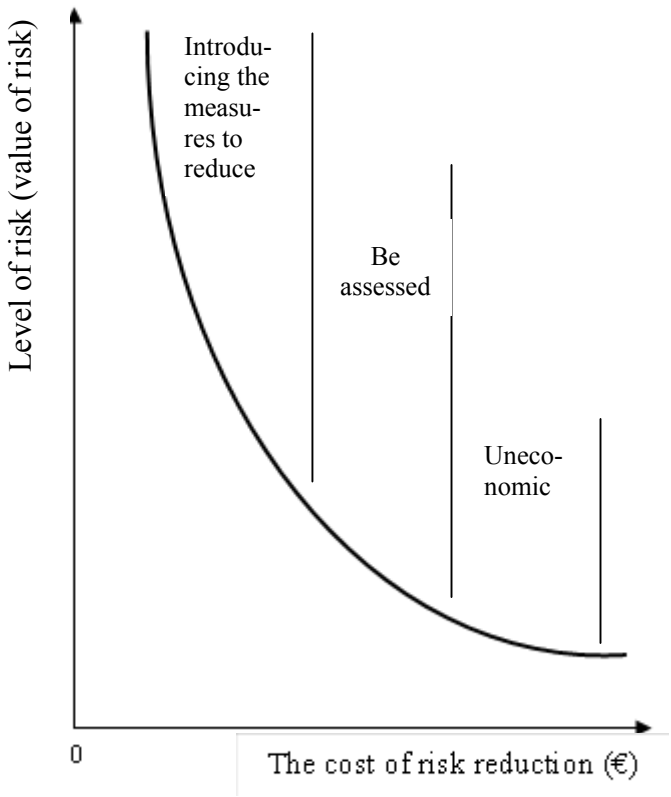

Figure 2 The cost of risk-reducing measures, [5]

If the aggregate cost of implementing all the measures for dealing with the risk exceeds the available budget, the plan should clearly specify the order of priorities according to which individual measures are implemented. Measures for dealing with risks that can not be within the limits of available budget implemented must either wait for the allocation of additional funds, or if for some reason, some measure is considered important, they must find additional finance.

6) Monitoring and reviewing

It is essential to monitor the risks, the effectiveness of risk treatment plan, strategy and management system that has been formed to manage the implementation of measures. The risks and effectiveness of control measures must be monitored to ensure that changing circumstances and priorities change risks. The review is an integral part of the management plan for dealing with risks.

7) Communication and consultation

Communication and consultation are an important part of each step in the process of risk management. Effective internal and external communication is important to ensure that those responsible for implementing risk management, as well as those who have taken

interest, understand the nature of the decision and the reasons why specific actions are required.

Comprehensive upgrading of security is the beginning of the 21st century one of the most important tasks facing the whole of society, from national governments, but also from management of each company. The European Union is slowly trying to design effective procedures for reducing risks in traffic. These include:

Regulation of the European Parliament and Council Regulation (EC) č.1071/2009, which establishes common rules for the authorization to pursue the occupation of road transport, thereby improving the service quality and increase road safety.

International Standard ISO 28000:2007 Specification for security management system in the supply chain, which specifies requirements for safety management system and improves overall supply chain security.

Further evidence is a study aimed at reducing attacks on drivers in international road freight transport issued by the International Union of Road Carriers IRU in 2008. [6]. And their efforts to introduce "intelligent parking trucks", which should provide a safe parking place the truck, thereby protecting the driver and cargo from the possible risks.

Literature:

[1] BOYLAUD, O., NICOLETTI, G.: *Regulatory reform in road freight*. [online]. OECD Economic studies No.32 2001/I.,

[2] ENYI PATRICK ENYI: *Risk prediction and reduction in passenger transport service delivery*, [online]. Covenant University, Canaanland, Ota - Department of Accounting, 2006

[3] PŘIBYL, P., JANOTA, A., SPALEK, J.: *Analýza a řízení rizik v dopravě, Tunely na pozemních komunikacích a železnici*, vydavateľstvo BEN Praha, 2008, ISBN 80-7300-214-0

[4] SZABO, Ľ., VARCHOLOVÁ, T., DUBOVICKÁ, L.: *Manažment rizika*, vydavateľstvo EKONÓM, Bratislava, 2005, ISBN 80-225-1949-9

[5] STN 01 0380 Manažérstvo rizika

[6] IRU: *Attacks on drivers of International heavy goods vehicle*, 2008-02-18

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