Available online at www.sciencedirect.com

ScienceDirect

Procedia Engineering 122 (2015) 258 – 265

Procedia Engineering

www.elsevier.com/locate/procedia

Operational Research in Sustainable Development and Civil Engineering - meeting of EURO working group and 15th German-Lithuanian-Polish colloquium (ORSDCE 2015)

Risk analysis in construction project - chosen methods.

Agnieszka Dziadosz[a] Mariusz Rejment[b]

[a] *Institute of Structural Engineering, Poznan University of Technology, Piotrowo 5, 60-965 Poznan, Poland*
[b] *Institute of Building Engineering , Wroclaw University of Technology, Wybrzeze Wyspianskiego 27, 50-370 Wroclaw, Poland*

Abstract

The risk is a measurable part of uncertainty, for which we are able to estimate the occurrence probability and the size of damage. The risk is assumed as a deviation from the desired level. It can be positive or, which most often happens, it can be negative. Therefore, the risks analysis is so important for project selection and coordination of construction work. The risk analysis is regarded as the analysis of adverse events even at the stage of planning and programming of a construction project. This analysis enriches the decision-making process and provides additional arguments, which help to select the optimal variant of a construction project using the Multi-Aspects approach. This article presents three different methods of the risk analysis as well as highlighting their disadvantages, advantages and primary areas of application (selection or pre-estimation). These methods differ in their methodology from each other. The verification was started from the simplest techniques using some qualitative variables. This method is based on the considerable subjectivity of a decision maker although it is relatively simple and easy to use. The analysis was finished on the statistical method, which determines the type of used data therefore it affects the quality of the results. The areas of application and analytical capacity of the listed methods are illustrated with the short examples, simultaneously outlining their characteristics from the analysis. The research problems, which are the canvas of application of the discussed methods are not mutually interrelated. They present different aspects of variants of the investment process.

Peer-review under responsibility of the organizing committee of the Operational Research in Sustainable Development and Civil Engineering - meeting of EURO working group and 15th German-Lithuanian-Polish colloquium

Keywords: risk management, project management, decision-making process in construction project., project selection, risk identyfication and assessment.

* Corresponding author. Tel.: +0-000-000-0000 ; fax: +0-000-000-0000 .
E-mail address: agnieszka.dziadosz@put.poznan.pl

Peer-review under responsibility of the organizing committee of the Operational Research in Sustainable Development and Civil Engineering - meeting of EURO working group and 15th German-Lithuanian-Polish colloquium
doi:10.1016/j.proeng.2015.10.034

1. Introduction

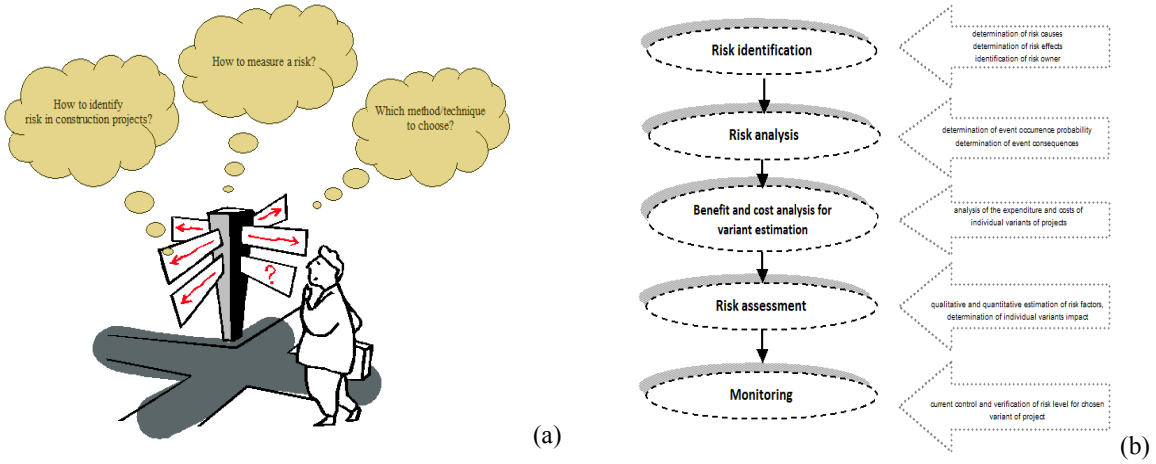
The phenomenon of risk is a subject of investigation for many both practitioners and theorists. However, only a few of them take these problems and try to formulate the problem within the framework of a procedure. In many publications, the authors deal with the problem of identification of hazards areas and their classification in different groups, among others, due to the source of origin, the impact size, etc. [10]. The number of papers proposing a methodology of quantifying of the risk and elaboration of procedures for the adoption of appropriate actions (so called "an appropriate strategy on risk response") is relatively lower. This paper briefly outlines the area of risk management in the construction industry against the background of the selected publications [1-31]. The aim of the paper is to present the three methods used for the risk analysis with simultaneous signaling of their characteristics features and specifying of the usefulness degree in the discussed problems. The character of the presented methods, a kind of the solved decision-making problem and the type of used data made impossible their mutual comparison. However, the authors have identified the common features of the methods, reflecting the analytical decision-making process and the individual features of each of them..

2. Risk management in construction projects

In recent years, it is noticeable the increased interest of the risk problem from the perspective of the construction industry. The research areas in the risk management are focused on the identification of random factors, determination of the probability of their occurrence and their impact on the course of a construction project. The problems, which often occur in terms of the risk analysis in the listed publications, are the following ones:

- Methodology/procedure of risk analysis for a project [1, 13, 24, 25, 26, 30].
- Proposition of risk classification according to the source of origin, type, consequences [1, 10].
- Review and classification of selected methods supporting the risk management in projects [2, 21].
- Analytical application of method/tool to a specific problem in the scope of risk analysis [4-7, 13, 15, 16-19, 22-26, 28-31].
- Risk management in construction projects – theory and practice [3, 8, 9, 27].

A risk, as a measurable part of the uncertainty, is most often treated in the literature as a possibility of incurring of a loss. The number and scope of the problems associated with the realization of the project is large. Before we start their in-depth analysis (in terms of risk analysis) we should find the answers to at least three key questions (Fig. 1 (a)).



(a) (b)

Fig. 1. (a) decision problem; (b) decision making procedure in risk management, source [own work].