

A Review on Critical Risk Factors affecting building construction projects

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Abstract: Construction industry is highly risk prone, with complex and dynamic project environments which create an atmosphere of high uncertainty and risk. The industry is vulnerable to various technical, socio-political and business risks. The track record to cope with these risks has not been very good in construction industry. As a result, the people working in the industry bear various failures, such as failure of abiding by quality and operational requirements, cost overruns and uncertain delays in project completion. Risk management is a process which consists of identification of risks, assessment with qualitatively and quantitatively, responses with a suitable method for handling risks, and then controls the risks by monitoring. This paper covers the concepts of risk management and various risk analysis techniques to be used for the one stop solution for all types of hazards most likely to occur during any construction project lifecycle.

Keywords: construction industry, Risk Management, Risk Analysis

I.INTRODUCTION

The development of infrastructure is one of the most important activities that can boost up the business of various industries, thereby increasing the gross domestic product (GDP) of the country. Construction projects are always unique and risks raises from a number of different sources. Risk is defined as any action or occurrence which will affect the achievement of project objectives. Risk management is a technique which is used in many other industries from, IT related to business, automobile, pharmaceutical industry, to the construction sector. Risks and uncertainties inherent in the construction industries are more than any other industries. Many industries have become more proactive about using risk management techniques in project. However, with respect to the construction industry, the same is not used commonly. Risk is an integral component of any project. Risk is present in all projects irrespective of their size or sector. No

project is totally free from risks. If risks are not properly analyzed and strategies are not trained to deal with them, the project is likely to lead to failures. Risk management is an integral part of the various process and stages for identifying the different risk associated with a project. In its broader manner it can be said to look for more positive events in the project thus by reducing or minimizing the impact of negative or unwanted events so as to reduce the probable risk. No project or industry is risk free, all of them bears risk at various stages at different amount and varies from one activity to other.

II.OBJECTIVE

The main objective of this project is to identify the key risk factor which affects the building construction projects.

III.LITERATURE REVIEW

To determine the risk factors, a number of studies has been carried out which are as follows:-

- A Study of Risk Factors Affecting Building Construction Projects. P.Patel krishan (Vol.3 Issue 12, Dec 2014)
- Critical Factors Influencing to Management Risk in Construction Projects V.Sathishkumar, P.N.Raghunath. (Vol.4 Issue 1, Jan 2015)
- Risk Assessment Methods and Application in the Construction Projects. Dr.R.K.Kansal, K. Manoj Sharma(Vol.2 Issue 3, June 2012)
- Management of Risk in Construction Projects in Maharashtra. M.G.Bhandari, Dr. P.G.Gayakwad (Vol.3 Issue 1, Jan 2014)
- An Investigation into Risk Factors and Preventive Measures in Building Construction Projects in Abuja FCT, Nigeria. Ibrahim, Abdul (Vol.4 Issue 7, July 2014)

Risk Management in Construction Projects, Seyed Hossein Abedian Kalkhoran. (Vol.10 Issue 3, April 2014)

An Assessment of Risk Identification in Large Construction Projects in Iran, Mehdi Tadayon, Mastura Jaafar. (Vol.1 Issue 5, 2012)

Identification and Evaluation of Risk Factors Affecting the Supply Chain Environment of Construction Industry, S.B. Khattak, M. Abas. (Vol.20 Issue 2, 2015)

IV. RISK MANAGEMENT PROCESS

Risk management is the process which consists of identification, assessment, response and review. Risk Identification: Risk identification can be done by the following methods

a. Brainstorming: This is one of the most popular techniques. Generally, it is used for idea generation; it is also very useful for risk identification. All relevant persons associated with project gather at one place. There is one facilitator who is briefing about various aspects with the participants and then after note down the factors. Before closing it the facilitator review the factors eliminate the unnecessary ones.

b. Delphi Technique: This technique is similar to brainstorming but the participants in this do not know each other and they are not at the same place. They will identify the factors without consulting other participants. The facilitator like in brainstorming sums up the identified factors.

c. Interview/Expert Opinion: Experts or personnel with Sufficient experience in a project can be a great help in avoiding/solving similar problems over and over again. All the participants or the relevant persons in the project can be interviewed for the identification of factors affecting risk.

d. Past Experience: Past experience from the same kind of project, the analogy can be formed for identification of the factors. When comparing the characteristics of projects will provide insight about the common factors.

e. Checklists: These are simple but very useful predetermined lists of factors that are possible for the project. The check list which contains a list of the risks identified in projects undertaken in the past and the responses to those risks provides a head start in risk identification.

V. RISK ASSESSMENT

1. Quantitative methods:

a. Sensitivity Analysis: This is carried out to identify the uncertain project components which will have maximum impact on the outcome of the project. After a risk model is made a sensitivity analysis is carried out to check the sensitivity of different elements of the model on project outcome. To do these the values of one variable at a time is changed and the impact of these changes is then seen on the project.

b. Scenario Analysis: Scenario analysis gives the impact of different scenario of the project or impact of different risk if that occurs simultaneously. A fair decision can be made after this analysis, the option which will give lesser loss or hazards that option can be opted.

c. Probabilistic Analysis (Monte Carlo Simulation): A project simulation is done using a model to show the potential impact of different level of uncertainties on project objectives. Monte Carlo Simulation is generally used for this analysis. It can quantify the effect of uncertainties and risks on project budget and schedule. It simulates the full system many times, each time randomly choosing a value for each factor from its probability distribution. It uses three point estimates like most likely, worst case and best case duration for each task in time management.

d. Decision Trees: This analysis is carried out by decision tree diagram. Decision trees are very helpful to both

Formulate the problem and evaluate options. In this analysis There are graphical models used to represent a project and can clearly reflect the effects of each decision taken in the project.

2. Qualitative methods: Qualitative methods for risk assessment are based on descriptive scales, and are used for describing the likelihood and impact of a risk. These relatively simple techniques apply when quick assessment is required in small and medium size projects. Moreover, this method is often used in case of inadequate, limited or unavailable numerical data as well as limited resources of time and money. They are listed as follows:

a. Risk probability and impact assessment: By applying the method called risk probability and impact assessment, the likelihood of a specific risk to occur is evaluated. Furthermore, risk impact on a project's objectives is assessed regarding its positive effects for opportunities, as well as negative effects which result from threats. For the purpose of this assessment, probability and impact should be defined and tailored to a particular project. This means that clear definitions of scale should be drawn up and its scope depends on the project's nature, criteria and objectives. PMI (Project Management Institute) identifies exemplary range of probability from 'very unlikely' to 'almost certain'; however, corresponding numerical assessment is admissible. The impact scale varies from 'very low' to 'very high'.

b. Probability/impact risk rating matrix: Probability and impact, which were assessed in the previous step, are used as a basis for quantitative analysis. For this

reason findings from the assessment are prioritized by using various methods of calculation which can be found in the literature. Westland computes the priority score as the average of the probability and impact. The range of priority score, the rating and color are assigned to indicate the importance of each risk. Threats with high impact and likelihood are identified as high-risk and may require immediate response, while low priority score threats can be monitored with action being taken only if, or when, needed.

c. Risk categorization and Risk Urgency Assessment: Risk categorization is a way of systematizing project threats

According to their sources, in order to identify areas of the project that are most exposed to those risks. Tools which can be used in this method are work break down structure (WBS) or risk breakdown structure (RBS), and their role is to develop effective risk response. WBS breaks down large activities into small, manageable units and creates linked, hierarchical series of independent activities. RBS categorizes risks and shows their dependencies. The role of the second method, Risk Urgency Assessment, is to prioritize risks according to how quick response they require.

VI.RISK RESPONSE

In this study Questionnaire survey was developed based on 10 factors in building construction. For each factor the respondent's scale of importance rate using five point scale of 1 to 5 is adopted. It is rated as follows 5=very high; 4=high; 3=medium; 2=low; and 1=very low. From questionnaire survey, a field study was carried out to get feedback from experts in construction industry on the factors identified from literature reviews

S.NO	PARAMETERS	MEAN
1.	Unmanaged cash flow	4.25
2.	Difficulty to get permit	3.58
3.	Poor relation and dispute with partner	3.20
4.	Defective design	3.18
5.	Unavailability of Resources	3.43

VII.CONCLUSION

Risk management will not remove all risks from the projects. Its main objective is to ensure that risks are managed most effectively. This review of critical risk factors by analyzing and finding the possible measures to the building construction in order to avoid the identified factors in the future projects. Moreover in this paper, various risk factors in every building construction project has been analyzed to avoid this in the future construction projects.

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