

# A Review on Risk Management in Residential 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 main objective of this review paper is to gain understanding of risk factors that could be in front of building projects. The review paper aims to identify the risks that have been more prone in the case of the construction practitioners. Consequently, the risks play a crucial role for the completion of project within the time schedule and planned budget. The critical risk factors and its assessment techniques were determined through a review of various international construction projects.

**Keywords**— Risk , Risk Management, Typical risks, Software.

## I. INTRODUCTION

The construction industry has a bad reputation for its work. The industry had experienced for time and cost overruns. This bad reputation is due to many reasons. One of them is that the construction industry is one of riskiest of all business types

### A. Typical Risks on a Construction Project

- ❖ Occurrence of accidents to operatives on site causing physical injury.
- ❖ Failure to complete within the stipulated design and construction time.
- ❖ Failure to obtain the expected outline planning, detailed planning or building code/regulation approvals within the time allowed in the design program.
- ❖ Unforeseen adverse ground conditions delaying the project.
- ❖ Unexpected rises for labor and materials.
- ❖ Force majeure.
- ❖ Failure to complete the project within the client's budget allowance.
- ❖ Loss of the contractor caused by the late production.

It is important to distinguish the sources of risk from their effects. Ultimately, all risk encountered on a project is related to one or more of the following:

- Failure to keep within the cost budget/ forecast/ estimate/ tender.
- Failure to keep within the time stipulated for the approvals, design, construction and
- occupancy.
- Failure to meet the required technical standards for quality, functions, fitness for purpose, safety and environment preservation.

The effect of adverse events will be financial loss. The professional advisors, contractors and suppliers aims to determine the discrete sources of risk which cause to failure occur, and to develop a risk management strategy that provides for the most appropriate organizations to carry that risk.

### B. Risk and Uncertainty

Risk is defined as the exposure to loss/gain, or the probability of occurrence of loss/gain multiplied by its respective magnitude. Events are said to be certain if the probability of their occurrence is 100% or totally uncertain if the probability of occurrence is 0%. In extremes that have found in between the uncertainty varies quite widely . Risk also can be defined as a characteristic of a situation, action, or event in which a number of outcomes are possible, the particular one that will occur is uncertain, and at least one of the possibilities is undesirable. Risk is also defined as the presence of potential or actual constraints that could stand in the way of project performance, causing partial or complete failure either during construction or at time of use. It is also stated that there is no all encompassing definition of risk and provided his interpretation of what risk constituents:

$$\text{Risk} = \text{Hazard} \times \text{Exposure}$$

Hazard is defined to be the way in which an event can cause harm and exposure as the extent to which likely recipient of harm can be influenced by the hazard.

### C. Risk Management Process

Risk management contains the schematic or properly arranged application of management policies, processes and procedures to the tasks of establishing the context, identifying, analyzing, assessing, treating, monitoring and communicating risk.

Risk management process (RMP) is the basic principle of understanding and managing risks in a project. It consists of the main phases: identification, assessment and analysis, and response as shown in Figure . All steps in RMP should be included when dealing with risks, in order to efficiently implement the process in the project. Many variations of RMP are available in literature, but most commonly described frameworks consist of those mentioned steps. In some models there is one more step added, and the majority of sources identify it as risk monitoring or review. For the purpose of this paper the model of RMP will be used for further analysis.

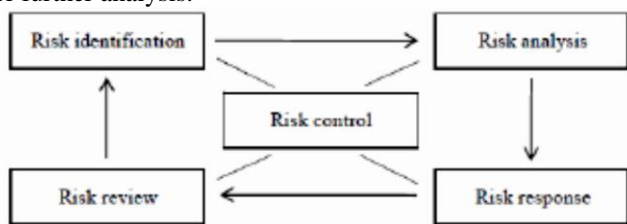


Fig. Process of Managing Risks

## II. LITERATURE REVIEW

Alfredo Serpell, Ximena Ferrado et al; mentioned that today every organization faces uncertain events that occur in different environments and with different characteristics and impacts. Uncertain events with negative impacts are called risks. The Construction industry is being exposed to these uncertainties, which are complex and diverse risks. Risk management is a positive and proactive process intended to mitigate or eliminate the risk we count on risk management which is an integral part of project management. Risk management in both construction business and construction projects should be a part of the organizational culture. This would allow its development and implementation and to become a standard for planning and implementation of projects. Important part of this is to generate an effective management of knowledge to have a system which can keep the lessons learned so that they can be spread and reused in future projects. During the realization of this research it has been observed that the lack of knowledge about risk management within the domestic construction industry has become a barrier that has prevented the participation of some companies that have been not willing to contribute to the study.

K.Abhinaya and S.Priscil Nidhu explained that, Risk management is the systematic process of identifying, responding and analyzing to project risk. Risk is an uncertainty inherent in possibility and plans of something happening that can affect prospects of achieving, business and project goals. Risks that have occurred in the construction of road and highway projects have a major impact on issues related to cost, time and quality of project delivery. The study investigated the use and awareness of risk assessment and

management processes with respect to cost efficiency, time and quality of highway and road construction projects using SPSS to find out the different risk factors that have been occurred so far from questionnaires survey data for preventive measures or mitigation techniques for various risks on construction site. Statistical dependency correlation analyses showed that the use of risk assessment in the reported projects has improved quality of project and construction management.

K.Jayasudha, Dr.B.Vidivelli and E.R.Gokul Surjith, Construction of bridge projects results in complex and dynamic problems in circumstances of high uncertainty and risk, which are compounded by demanding time and cost constraints. This research sought to identify the risk factors that affect the performance of bridge projects as a whole and analyzed by using SPSS software and other appropriate tools and techniques to develop a risk management framework. The study was mainly performed using the questionnaire survey which was collected from the various multi project construction contractors and project manager of different sizes by mail or by personal meeting. The study mainly focused to assist management in identifying activities where there is a risk of time and financial aspects and hence provide a basis for management to take objective decision on the reduction of risk to an agreed level. These findings are very important for implementing further effective measures to ensure the right direction of future development.

Dr.R.K.Kansal and Manoj Sharma, There are many risks in any type of the project particularly in construction project. Risk is a negative term referring to loss and impact of loss, but there is also positive risk involving favourable results and their impact is known as opportunity. It is necessary to include risk management in project planning and management so as to identify, assess, manage and control the risks that would be adverse to the project goals. The study aimed to assess the degree of knowledge and utilization of risk identification techniques in the construction projects. The paper suggested risk assessment approaches such as brain storming, checklist, flowchart, delphi method and risk significant index method which are applied in various areas and the problems are solved. It was observed that currently used risk assessment methods can be integrated into new approach that can aid the decision makers applying the risk assessment effectively.

Shankar Neeraj and Balasubramanian.M, Construction projects are generally used in complex and dynamic environments resulting in circumstances of high uncertainty and risk, which are compounded by demanding time constraints. The construction companies need to include risk as an integral part of their project management. Decision making such as risk assessment in construction projects is very important in the construction management. The identification and assessment of project risk are the critical procedures for projecting success. The study determined the key factors of risk in construction industry and were analyzed through pilot survey which include experts of academic, governmental sectors and construction industry were interviewed. It also addressed the limitation and gap in the current literature and

provide a framework for determining optimal risk assessment model. The approach provided a more effective, accurate and organized decision support tool.

V.Sathishkumar, P.N.Ragunath and K.Suguna, Risk is said to be an event that occurs uncertain or condition that, if it occurs has a positive or a negative effect on a project objective. Risk management is the systematic process of identifying and analyzing and responding to project risk. Risk management includes maximizing the probability and consequences of adverse events to project objectives. The study aimed in the identification of risks that are caused in various construction projects and calculating the risks severity to personal and property. The paper describes largely on the survey questionnaire which was collected from various sources and it seeks to identify and assess the risk and develop a management framework which the investors/ developers/ contractors can adopt when contracting construction works and the data's were analyzed by descriptive statistics & ANOVA.

V. Sakthiniveditha and Pradeep.T, The second largest industry that is existing next to agriculture is the Construction industry. It makes a significant contribution to the national economy and provides employment to large number of people. It is estimated that the high-rise or multi storey buildings are the most important part of the construction for the greater development. The risk involved in this part also rates higher in the construction industry. The study was based on the risk assessment in the construction of high rise buildings based on literature review and a questionnaire survey. From the review it was found that the major part of risks in high-rise buildings are caused due to technical, financial, physical and constructional problems. The maximum risk rating factors and least risk rating factors given by project engineers in relation with government departments, local protectionism and industrial disputes were discussed.

Alfredo Federico Serpella, Ximena Ferrado et al,; One of the major roles undertaken by a project manager is the management of risk of a project. An effective and efficient risk management approach requires a proper and systematic methodology and more importantly knowledge and experience. Based on a three-fold arrangement a knowledge based approach and a methodology was made that includes the modeling of the risk management function, its evaluation and the availability of a best practice model in order to overcome the problems faced in the risk management of construction projects. It is also suggested that the proposed approach allows clients and contractors to develop a projects risk management function in order to overcome the drawback in Chile which was that both owners and contractors do not systematically apply risk management practices as they found it resulting in negative consequences for projects performance.

A.Suchith Reddy, Risk management process consists of identification, assessment and setting preference for risk mitigation. This may include a synchronized and cost effective way of using the materials and resources in an order to minimize the hazards that may arise along with monitoring and controlling the unfortunate events they may occur. The

paper suggested the most useful way for implementation of risk management in construction industry, to consider the different types of risk management techniques applied to alleviate risk, to identify the use of implementation of the risk management, to determine the factors that can influence the applications of risk management in the project life cycle, wherein to categorize the principles adopted in risk management. The study was clearly described based on the case study of British Airways Authority.

Krantikumar Mhetre, B.A.Konnur, Amarsinh.B.Landage, Construction industry is a highly risky area, which contains complex and dynamic project surroundings which create an atmosphere of high uncertainty and risk. Risks and uncertainties inherent in the construction industries are more than any other industries. Risk management is a process which is used to identify the project risks, analyze them and determine the actions to avert the threats on any project. It covers the concepts of risk management and various risk analysis techniques to be used for the one stop solution for all the types of hazards most likely to occur during any construction project life cycle.

#### Advantages of risk management

- ❖ Less uncertainty
- ❖ Achievement of objectives
- ❖ Reliability
- ❖ Reduction of capital cost
- ❖ Creation of value

#### Limitations of risk management

- ❖ If risks are improperly prioritized and assessed, time can be waste in dealing with risk of losses that not likely to occur
- ❖ Spending too much time managing and assessing unlikely risks can divert resources that could be more profitably.
- ❖ Unlikely events to occur, but if the risk is unlikely enough to occur, it may be better to simply retain the risk & deal with the result if the loss does in fact occur.

### III. CONCLUSION

The construction industry is known to have complexity in its activities and dynamic project environments generating an atmosphere of risks that must be taken into consideration in the decision process. For this reason, we have developed this treatise to elucidate the fundamentals of risk management through a concise new proposal of literature review for risk management in construction. Our explanation of this is venture is that over the years, this area has been acknowledged as a crucial process in the business institutions and the most discussed subject among experts and researchers in the construction sector. The paper have presented the most recent studies considering the impossibility to present all definitions of the concept of risk. This study was mainly a review; it looked at the literature relating to the concept of risk, risk management in construction as well as methods used in construction industry.

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