A STUDY ON RISK IDENTIFICATION AND ASSESSMENT IN THE CONSTRUCTION OF HIGH – RISE BUILDING

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ABSTRACT

Construction projects are developed in complex and dynamic environments resulting in the situation of high uncertainty and risk. Construction objects are unique and built only once and risks raises from a number of various sources. The results of construction differ in terms of location, production techniques, materials and the quality of the finished product with respect to space, quality and durability. Managers need to ensure delivery of projects to cost, schedule and performance requirement. Risk is present in all the activities in a project; it is only the amount which varies from one activity to another. Risk assessment is a tool to identify those risks in a project and manage it accordingly with proper treatment. The methodology of this study depends on the questionnaire survey which was collected from the local high-rise building contractors. A literature review, pilot study and interviews are conducted to identify the risk factors that affect the performance of construction industry. The questionnaire prepared was formulated by referring the relevant literatures and seeking advice in the area of construction risk management. The paper aims at studying the risk factors that has a negative impact on project budget and schedule in the construction of high-rise buildings.

Keyword : - *Construction risk management, risk assessment, risk factors*

1. INTRODUCTION

The construction industry is the second largest industry of our country. High-rise buildings are the most important part of the construction which plays a vital role for the development of the country. The risk factor in construction business is very high. Hence risk involved in high-rise structures also plays a major role in construction industry. Construction project objectives are always unique and built once. Risks are arising from different sources. Risk is defined as any action or process that negatively affects the accomplishment of project objectives and performance. Risks are unavoidable, only the amount of risk is varying from one activity to another. If risks are not properly managed it can cause failure. Therefore correct factor identification and assessment is necessary. This paper focused on the risk management and will cover the related literature and develop a questionnaire to identify and assess the risk factors affecting the high-rise buildings located in Ernakulam district of kerala.

2. RISK IDENTIFICATION

Risk identification is the first and the main step of risk management process. It attempts to identify the source and type of risks. Risk identification is the basis for the analysis and the control of risk. Correct identification of risk improves the effectiveness of risk management.

Many approaches on risk classification have been suggested in the literature for the effective risk management. In this paper construction risks can be divided into:

- External risks
- Project risks
- Internal risks

External risks are type of risks which does not fall within the control of project management team; like clients, consultants and contractors. Project risks are which occur during the construction process. Internal risks are the category which falls within the stakeholders.

2.1 Methodology

In this study, general focus has been made on the survey questionnaire which was collected from the local high-rise building construction projects. A thorough literature review was initially conducted to identify and assess the risk factors that inversely affect the performance of construction industry. Also interviews were conducted with personnel working for the construction industry in Ernakulam to check the effectiveness of the questionnaire. The final step is to assess the risk factors which have the highest impact in the project.

2.2 Questionnaire Survey

Data were collected directly from the involved people in construction projects of the fastest growing city of kerala, Ernakulam via distributing questionnaires and conducting semi-structured interviews. The questionnaire was designed based on the knowledge obtained from reviewing the literature, available samples and from expert advice. The questionnaire survey was conducted to determine the opinion of client, contractors and consultant regarding the risk factors. To ensure obtaining complete and meaningful response to the questionnaire an interview was conducted with each respondent to explain the objective of the study and to get input towards the questionnaire design, especially towards identifying risk types and management actions for controlling these risks. A questionnaire with 24 risk factors is prepared for the study.

The degree impact for each risk type was included in the questionnaire. The questionnaire was designed to examine practitioners' observations and judgments in determining the relative significance of each risk category. The degree of impact varies from project to project. The questionnaire is set for a general assessment of the significance of risk. 55 respondents give feedback. Each respondent was required to rank each risk on a scale from 1 to 5. After collecting the data, Reliability analysis was carried out by using Relative Important Index the ranking was carried out to analyse the primary data.
The relative importance index was calculated by the formula:

$$RII = \Sigma W / (A*N)$$

Where, W - weighting given to each factor by the respondents, A - highest weight, and N - total number of respondents. Higher the value of RII, more impact of the risk is considered.

2.3 Factors Influencing Risk

Risks associated with the construction industry can be broadly categorized into:

Table- 1: List of risk influencing factors

External Risks	Project Risks	Internal Risks
Union issues	Obsolete technology & Tools	Type of contract
Bribery & Corruption	Knowledge on equipment	Delay in license and permits
Fluctuation of raw material prices	Designing errors	Cost overruns
Scarcity of materials	Non availability of resources	Environmental regulations procedure
Shortage of labors	Labor accidents	Differing site conditions
Unpredicted weather conditions	Defective work/Rework	Late changes in design

Changes in laws and regulations	Acceptance of unrealistic deadlines in contract	Schedule delays
Changes in tax	Unrealistic planning	Supply of defective materials

3 RESULTS AND DISCUSSIONS

Risk factors on the construction projects are divided into three groups: External, Project and Internal. The following graphs show the impact of risks in high-rise building construction.

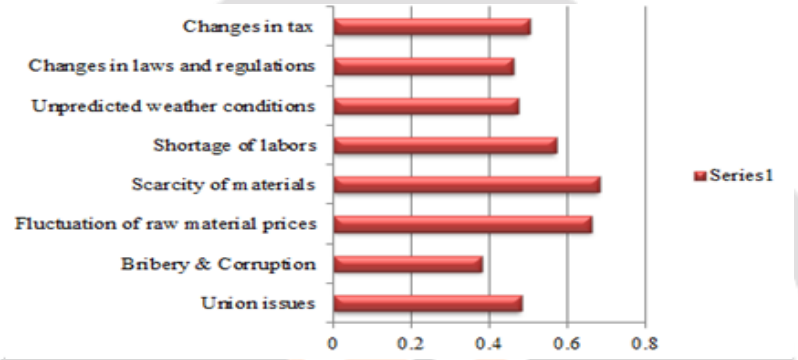

Chart-1: Impact of external risk factors

Chart-2: Impact of project risk factors

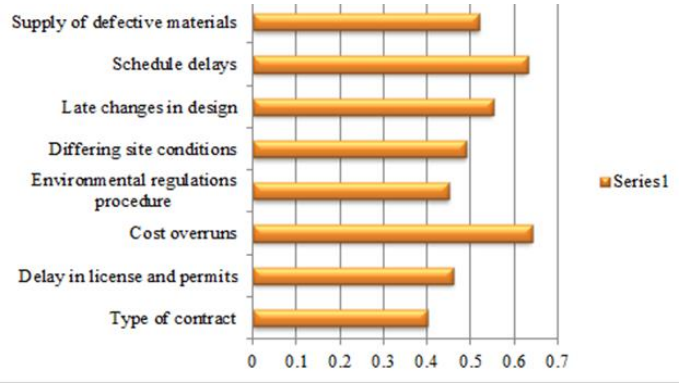

Chart-3: Impact of internal risk factors

Scarcity of materials, Non availability of materials and cost overrun are the high impact risk factors in external, project and internal risks respectively whereas bribery and corruption, obsolete technology and tools, Type of contract are the factors having less impact in external, project and internal risks respectively.

4. CONCLUSIONS

Risk management is an integral part in the process of construction. The correct identification and assessment of risk factors are the critical procedure for the success of the project. A total of 24 risk affecting factors in three divisions are identified through pilot study and from expert advice. The impact of each factors are studied. Formal risk assessment techniques are rarely used in the construction industry in Ernakulam. The risk management and assessment can be improved by combining qualitative and quantitative methodologies to analyse the risks.

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