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Qualitative Risk Analysis in Construction Projects

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Abstract – The term risk can be also termed as a threat to a particular construction project .Threats are present everywhere. Particularly talking about the construction projects the risks are always present. The main aim of the project is to study of various risks in the construction projects, study their importance and impact on the projects and accordingly plan for the risk analysis. Here, the work done is to recognize and identify the risks in construction projects. In this study, the qualitative risk analysis methods are used to collect data, analyse it and find out the outcomes. The research methodology selected for risk management is, distributing questionnaire survey to various clients, consultants of various construction companies and various private contractors. Qualitative risk analysis is used for data analysis and probability-impact matrix method is used in particular.

***Key Words*:** Qualitative Risk Analysis , Probability Impact Matrix , Risks in Construction projects.

1.INTRODUCTION

The Risk management is an idea which is been utilized in every industry , it might be IT business, pharmaceutical business or automobile or the construction industry . Risk is not a certain event , if it occurs it can cause a positive or negative impact on a particular project. It is unpredictable and unexpected. Take for example: theft, earthquake, injury, etc. If these type of things happen, it can cost us financially, there can be a bad reputation, damage can happen to the organization or also can cause closing of organization .For each company there will be fixed fundamentals set for tackling of the risks according to which they work. This shows a solid connection between project success and the management of risk. Risk management is necessary for a construction project. Due to risk management initial cost of construction increases. But given the advantages of risk management, the extra cost spent on risk management is worth it. At the initial stage of construction, if we do risk analysis, risks and expenses incurred due to it are avoided. The Management of Risks is considered as one of the hardest part in the construction process and its application must be promoted in every one of the project to avoid risks and threats in the project.

There are basically two types of risk analysis,

1.Qualitative Risk Analysis.

2.Quantitative Risk Analysis.

In this project the study is done by taking into consideration the methods of Qualitative risk analysis.

2. NEED OF STUDY

The enormity of construction sector has associated possibility of colorful environmental, socio- political, and other unexpected problems which will bring huge loss to the company. Thus, well- organized operation of a project is needed by using all the types of operation which involves risk management as an important element, through the several stages of the project , in order to manage the pitfalls and reduce the cost overruns, time overruns, and quality and safety issues. It give practical tools for handling and also reducing the risks linked, ahead and during the duration of project , in a planned or organized way, so that any possible trouble to the emancipation of labors i.e. resources , cost, time, quality, and consummation of benefits or gains by proprietor, is suitably managed, to enable that the project is finished successfully.

3. OBJECTIVE OF STUDY

By studying the various literature reviews and actual circumstances in the construction of residential building projects, we have identified the following objectives of the study.

1) Identifying various risks which are unsure occur in the construction of residential buildings.

2) Categorizing the risks in terms of probability and impact as very high, high, moderate, low, and very low.

3) Performing qualitative risk analysis for finding out high risks.

4. LITERATURE REVIEW

1. Pawel szymanski – *"Risk management in construction projects".* This paper helps in the classification of the risks. The author has given the conclusion that the risks and threats are present everywhere and every area of life in one such is construction industry where the risk always present..

2. Agnieszka Dziadoz, Mariusz Rejment –*" Risk analysis in construction projects chosen method."* This paper concludes that the risks cannot be measured and the part which can be measured is uncertainty, which we are able to identify . This paper presents three types of risk analysis. They are methods, and advantages, disadvantages, others and selection of project (preestimation).

3. V. Rathna Devi.-" A Study on Risk Analysis in Construction Project." The aim of this study in this paper is to use earned value management as a quantitative method for the risk analysis. The method of quantitative analysis used here considers the financial risk and schedule risk as the major factor in the proper execution of project.

4. Jameelahammad Nadaf, Mahaboobali Nadaf, Balasaheb Jamadar, K. P. Thejaswi.- *"Qualitative Risk Analysis for construction project."* In this paper study of various risks present in construction projects are found out. Recognition of risks in the construction project is done. For the data collection, the distribution of questionnaire survey to the various contractors and consultants of the project is conducted. In this paper, the qualitative risk analysis method is used.

5. LITERATURE SUMMARY

The available and most relevant literature related to the risk analysis techniques such as the risk factors, methods used for risk analysis ,etc were reviewed. And the summary is mentioned below.

- Risk management is the systematic process which involves the identifying, analyzing, and responding to a particular risk in the project.
- The process of risk analysis are of mainly two types qualitative and quantitative analysis.
- The qualitative risk analysis is done by focusing on the identified risk factors based on the effect on quality.
- The quantitative risk analysis is expressed in terms of monetary value or we can say its based on effect on quantity.
- The aim of this study is to use the known resources to study the risk analysis using the qualitative risk analysis method.
- The process to be followed for the analysis can be learned from literature review.
- For the data collection, the distribution of questionnaire survey to the various contractors and consultants of the project is conducted.
- In this paper, the qualitative risk analysis method is used.
- Matrix for probability-impact is plotted and high risks are marked and a graph is plotted for high risks.

6. RESEARCH METHODOLOGY.

The main purpose and objective of the research methodology is to identify the risks in the construction projects and perform the risk analysis via the Qualitative method of risk analysis.

The stages of research methodology are ;

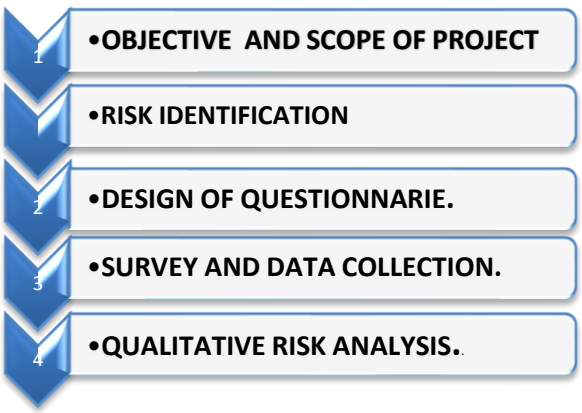

Fig -1: Figure

6.1.Objective and Scope of Project.

The study is carried with considering the following objectives:

- Classification the risks and get ratings for probability and impact and urgency for each type of risk.
- Construct the risk matrices to find high, moderate, and low risks.

6.2.Risk Identification.

Risk identification is a long and process which has to be performed repeatedly because as the project goes forward new type of risk develop through the life of the project . The format for the risk valuation should be continuous which allows the comparison between the effects of one type risk on the other. The identification process in the company or a firm includes the project team members. In this step several risk arising in the construction projects during its process from the formulation, mobilization and construction stage are categorized and listed.

Different levels of risk identification are:

i. Risk identification - Level 1:Project team members suggest risks occasionally to the project managers. If needed the project teams carry out risk discussions. There is no such defined process for the risk identification.

ii. Risk identification - Level 2:The project team checks the cost, scope, schedule, etc. of the project plan for the identification of risks. It also includes the suggestions of stakeholders and clients. Company lessons are considered by the project team while the identification process.

iii. Risk identification - Level 3: It is a standardized documented risk identification process. A previous database of risks is used by project teams as a template.

iv. Risk identification - Level 4: The lessons learned and risk database is taken into consideration for other projects. The risk identification process is fully used by large companies.

6.3.Design of Questionnaire.

The process of information collection used in this study, had the choice of two type of strategies: questionnaires and the individual discussions.

The result of the overview states that there are types of risks which influence the risk that occur in construction.

Types of risks are listed below:

1. Financial risks .
2. Management risks .
3. Environmental risks.

6.4.Survey and Data Collection.

In order complete the objective of the study successfully , the most important stage is collection of information which has to be accurate as well as relevant. The data collection is a method of collecting information records regarding a particular test which has to be authentic. Questionnaires have to be sent to the construction companies by mail or any other medium and some of the construction personnel specifically consultant, engineer, contractor, architect and labor were interviewed regarding the same.

6.5.Qualitative Risk Analysis.

Qualitative risk analysis involves estimating the probability of occurrence of the risk and impact of the particular risk on the project. In this technique, the exact numerical value of the impact and probability is not found but it is expressed in terms of very high, high, moderate, low, very low, etc. according to the reviews of experts and stakeholders.

This technique is used to categorize the risks according to their effects on the project functioning and the project objectives.

In this paper for qualitative risks analysis, we are going to use a risk matrix (P-I matrix) to categorize the risks.

To conduct qualitative risk analysis is carried out by marking following matrix.

• Probability-Impact matrix:

Probability is the likelihood of the risk to occur whereas impact is the effect of the risk on project functioning. Before making the P-I matrix, we have to identify risk, collect risk data, determine probability and impact levels. After doing these tasks, the P-I matrix is made. First, the probability and impact are given ranking generally from 1 to 5.

The ranking is given by considering the below table:-

SR.NO	PROBABILITY	IMPACT
1	Rare	Very Low
2	Occasional	Low
3	Somewhat Frequent	Moderate
4	Frequent	High
5	Very Frequent	Very High

Table -1.

Probability – Impact matrix:

It helps in the assessment of each risk's category for consideration and importance. The ratings for probability and impact are given below:

Probability 1-5

High - From 4-5 occurrence of probability

Medium - 3 occurrence of probability

Low - Between 1-2 occurrences of probability

Impact 1-5

High – This type of risk has a great impact on the project and hence the work has to be stopped.

Medium – This risk has a slight impact on the project and the work can go on.

7.RESULTS.

After the successful completion of the Questionnaire survey the average results were calculated and mentioned according to the type of risks .

P-Probability.

I-Impact.

Financial Risks.

SR.NO	RISKS.	P	I
1	Project Investments.	2	2
2	Worker Wages And Salary Delay.	3	5
3	Increased material cost	4	4
4	Unevenness in Foreign Exchange	1	1
5	Funds Released.	2	2
6	Import.	2	2

Management Risks.

SR.NO	RISKS.	P	I
1	Clashes between two groups.	1	2
2	Allocation of resources and labour	3	3
3	Relations of Company.	1	2
4	Less work assigned.	1	2
5	Unsatisfied Skilled staf.	2	3
6	Uncertain relations of employees.	2	2

Enviornment Risks.

SR.NO	RISKS.	P	I
1	Natural Calamities.	1	5
2	Uneven Weather Conditions.	3	4
3	Low Quality Enviornment Resources	2	2

After ranking the risks according to their probability and impact levels, the risk matrix is made by taking impact ratings on X-axis and probability ratings on Y-axis. The matrix is divided into 3 colour codes for representing 3 categories of risks.

The sample of P-I matrix is as follows:

The risk score is calculated by multiplying the probability and impact ratings. According to risk scores. Risks are categorized into 3 colour codes.

1) Red represents risks that need an immediate response (Risk score 15-25).

2) Yellow represents risks that require further analysis and investigation (Risk score 5-14).

3) Green represents risks that can be ignored. (Risk score 1-4)

Very Frequent	5	5	10	15	20	25
Frequent	4	4	8	12	16	20
Somewhat Frequent	3	3	6	9	12	15
Occasional	2	2	4	6	8	10
Rare	1	1	2	3	4	5
Probability /Impact		1	2	3	4	5
		Very Low	Low	Mode rate	High	Very High

Table -2.

8. CONCLUSIONS

The methods to categorise the project risks, that have been selected for construction projects, have been represented from various point of view such as (from contractors, consultants, and government contractors) and construction companies and firms.

From the results, I am arrived to a conclusion that majority of the construction projects have no procedure to deal with risks. Risk management is done without a dedicated process and even not done in some of the companies. All the risks which were recorded were given the ratings for their probability of occurrence, its impact on the project .

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10.BIOGRAPHIES

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