

A Study On Risk Assessment For Construction Project

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Abstract- Risk management is a practice that is gaining traction in a variety of industries. Many organizations implement a risk management procedure in their programs in order to improve results and earnings. Construction projects are often complicated and involve large budget, and as a result, reducing the risks associated with each project should be a top priority for each project manager. Construction projects are launched in complex and dynamic settings, resulting in high uncertainty and risk, compounded by tight deadlines. This study presents implementation of risk management in project cycle of project. This paper explains how to think about and quantify risk in construction schedules in a systematic way. The paper present risk assessment of construction for the multi-storey residential project. A case has been selected for further studies and risk matrices was used to find out and categorized risks as high, moderate and low.

Keywords- risk, risk management, risk matrices, project cycle, uncertainty.

I. INTRODUCTION

The construction industry is now one of the fastest growing industries in the world, with a huge impact on India's economy. If we take a look at the majority of developing countries, primary development activities account for about 85 percent of average capital wealth, about 15 percent of GDP, and more than half of the capital invested in fixed assets. The construction industry has a lot of job openings. There are several tasks that have substantial time and cost overruns. When large construction programs are postponed, they result in an increase in the overall budget. The project must be carefully planned and organized in order to be completed on schedule and with high quality work. This has increased competition among construction companies across the world. Because of these incidents, construction companies and consumer behaviour have changed.

With the objective of improving quality and lowering costs by increased performance, there is a need for suitable administration activities that can deal with the project in a fair and efficient manner. Planning and scheduling are crucial aspects of project management that will enable the project to be completed on schedule and within budget. However, the exercises in the building industry are subjected to various

exercises during the project life cycle, which may result in an increase in project costs as well as project delays. As a result, risk planning must be included in order to handle various risks that can arise during the project. As a result, risk management tactics must be accepted.

1.1 OBJECTIVE

- To analyze and conduct a brief analysis on various risks that are likely to occur in a construction project
- Classifying the risks based on various matrices, and then categorizing the risks as high, moderate, or low.
- Make a risk-mitigation strategy.
- Providing practical advice and suggestions for the improvement of risk management methods and their results.

1.2 SCOPE

- To reduce various risks occurring on construction site.
- To provide strategies to manage the risk occurring in various stages.

II. OVERVIEW ON LITERATURE REVIEW

Construction risks point-by-point review of the inspection works directed by researchers over the previous five decades. Paper suggests adding additional instruments and procedures, as well as extending the P-I chance. It also suggests using the project's initial expense, or 'risk cost,' to estimate the risk impact.

Risk is the variance from the chosen standard that is assumed. Danger can be both positive and negative. It's important to choose a project early on and control the construction process. This approach is dependent on the decision maker and is simple and straightforward to implement.

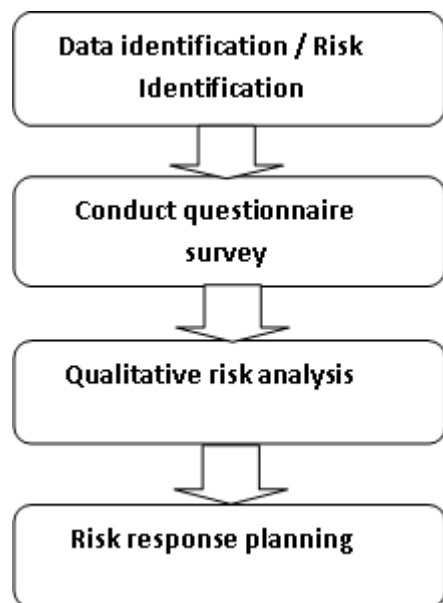
Paper focuses on risk identification and discusses how to minimize risk in megaprojects. The papers published since the year 2000 have been reviewed, and research has been performed using ATLAS and a checklist. This paper responds to both academic and practical concerns.

This work which is carried out china based case study is considered. Author concluded that contracting is big part in construction project. Author concludes, determining and managing the various risk factors for the overseas construction projects is very important. Primary focus is on the effort that can be made on the elusion of cost and time. Risk management is reflected in three stages of the life cycle of construction projects.

III. METHODOLOGY

The analysis methods are used in this study to collect data, analyze it, and report on the results and outcomes. The risk management approach chosen is the delivery of questionnaire surveys to different contractors and customers, as well as the project consultant. Data is analyzed using qualitative risk analysis. The research is being carried out with the following goals in mind.

- Sort the risks into categories and assign each one a likelihood, influence, and urgency ranking.
- Create risk matrices to determine which risks are elevated, moderate, and low.
- Suggestion for a risk response for a construction project with a high level of risk.



3.1 FACTORS AFFECTING RISKS

The factors affecting risk are as follows:

- **History:** If a time-consuming project has been completed several times before, the likelihood of success with new projects is high since the procedure has been identified, while new projects have more risks.

- **Experience and skilled team:** In order to successfully execute the project, the team must have a comprehensive understanding and capability in the areas that will have a direct impact on the project's success and outcome.

- **Stability in organization:** The project's vision and mission should be pursued by all management staff. If the organization's top level is unstable, the project's flow would be unlikely and irrational, and resources will be used in inefficient ways, which is a proven reality.

- **Team size:** Team size can have a positive or negative effect. For example, if for design purposes fewer members are allocated than necessary, it can be a reward if the team size is adequate to complete the design, or it can be a threat because the designing would take longer due to inadequate team size and other factors.

- **Complex nature of project:** Because of the sophisticated or complex nature of the project, the probability of failure is very high.

- **Availability of resources:** Every project is dependent on the availability of resources. If resource mobilization does not take place correctly and on schedule, it will have a number of negative effects on the project.

- **Time:** In a project with a tight and compressed timeline, the risks increase because risk modification plans cannot be easily rendered due to the lack of time.

3.1.1 PROJECT RISK MANAGEMENT

Risk management is a process through which businesses identify events, prioritise them, and mitigate the negative effects of uncertainty. As a result, risk management is an effective strategy for mitigating the detrimental effects of a specific event. The method of defining risks solely from a downward perspective can lead to aversion.

Risk aversion is a common personality trait, but in industry, avoiding all forms of risks is nearly impossible. The majority of risk-taking behaviour are linked to external factors. As a result, businesses must be extremely astute in managing their risks in order to not only reap the benefits, but also to continue to grow.

Risk management is divided into six steps:

- Make a plan
- Recognizing dangers

- Risk assessment (qualitative)
- Risk assessment based on quantity
- Preparing for a crisis
- Managing and reporting risks

3.1.2 TYPES OF RISK

Risks are divided into two categories: external risks and internal risks. External risks are those that are caused by environmental factors, whereas internal risks are those that occur within the project. Risks may be categorized as acceptable or unacceptable, with unacceptable risks being those that have a negative effect. Risks can have a short lifespan if the effects are instant, or they can have a long duration if the effects take time to manifest. Manageable risks are those that can be managed, while unmanageable risks are those that cannot be managed.

- **Technical risks:** - The likelihood of an uncertain event occurring as a result of incorrect implementation and execution of technical processes, such as inexperienced and untested technological procedures, entails some degree of technical danger, which may result in a loss of resources, expense, time, and efficiency, as well as harm to facilities and individuals. Technical risks include incorrect preparation, inadequate site investigation, incomplete and flawed plans, defects in drawings, and so on.

- **Financial risks:** - This is a term that is used to describe various forms of risk associated with a project's investment, such as transactions such as loans, deposits, raising funds from clients, changes in market prices, different accounting standards, changes in foreign exchange, and so on.

- **Management risk:** - Uncertain resource productivity can trigger project delays and have a major impact on the project's goal. Collaboration among team members, as well as the participation of professional personnel, are critical to the success of any project.

- **Logistic risks:** - The rate of harm or possibility of loss caused by equipment failure, lack of sufficient transportation facilities, lack of equipment spare parts, and failure to access resources are all considered logistic risks, and they all have to do with transportation.

- **Socio-political risks:** Sociopolitical risks occur when there is a chance of loss or harm as a result of changes in rules and regulations, legal conditions, corruption, by-law changes, protected rules, and pollution control rules.

- **Environmental risks:** These are risks that occur outside of the project and are beyond the project's control, such as natural disasters, weather, and daily changes, as well as other climatic factors.

- **Construction risks:** These are risks that occur as a result of inappropriate activity execution, monitoring, or insufficient safety and security on construction sites, among other things. Risks may be classified as static or dynamic. Dynamic threats are those that include new inventions, creations, new concepts, and opportunities. For example, consider the development of new technologies and processes, which may result in both profit and loss.

3.2 METHOD

1. Risk identification

Since new risks emerge as the project advances through the project life cycle, risk detection is a continuous process. The risk valuation format should be continuous so that the consequences of one risk can be compared to those of another. The project team members are included in the organization's identification process. The various risks that arise in the construction phase during the formulation, mobilization, and construction stages are classified and specified for this reason.

2. Questionnaire survey

For the case study LACASA, a questionnaire survey was conducted with ten construction companies, and the ratings for likelihood effect, urgency, and priority were obtained for further project analysis.

3. Qualitative risk analysis

Qualitative risk analysis entails assessing the likelihood and effect of different risks and listing them in order to increase the project's success and productivity by prioritising the risks. The likelihood or probability of risks occurrence, the resulting effect of risks if they occur, and the urgency of risk response that we take are used to value the priority defined risks.

The qualitative risk analysis is performed using the matrices mentioned below:

i) Probability – Impact Matrix: It aids in determining the priority of each risk for consideration and its significance. The following are the likelihood and effect ratings: 1–5 probabilities

- High - Chance of incidence ranges from 4-5.
- Chance of occurrence medium – 3
- Low-Chance of incidence is about 1-2Impact 1 to 5

• High-risk event with the potential to have a significant effect on the project's schedule, efficiency, timeliness, and expense. The work of an operation cannot be continued and will be stopped; as a result, the work will be postponed

• Medium - The occurrence of a risk that will have a minor effect on the company's project priorities and objectives. At this stage, the work will be continued.

• Low – the occurrence of risk would have no effect on the project's priorities and objectives.

ii) Impact -urgency matrix:It lists the threats that will necessitate a quick response or that must be handled right away.1–5 on the scale of urgency

• High - The incidence of a danger that must be dealt with immediately/quickly.

• Medium - When a danger occurs, there is sufficient time to take action.

• Low - The occurrence of risk is of low importance.

iii) Probability -urgencymatrix:

Assessing threats based on their likelihood of occurrence and urgency is critical for the project's risk response.Priority-urgency matrix:Risk priority is a ranking outcome based on the likelihood of a risk occurring and its likely effects.Priority is defined as the product of probability and effects.

4.Risk Response planning

Risk response preparation entails evaluating methods to reduce or eliminate any project risks, as well as the chances of reducing their effects. A risk response plan is used to resolve high-priority risks.

3.3 DATA COLLECTION

The analysis methods are used in this study to collect data, analyze it, and report on the results and outcomes. The risk management approach chosen is the delivery of questionnaire surveys to different contractors and customers, as well as the project consultant. Data is analyzed using

qualitative risk analysis. The research is being carried out with the following goals in mind.

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IV. RESULTS

PROBABILITY IMPACT MATRIX

Very Likely	5					
Likely	4			T2,T6	T11,F1,L1,E2	
Possible	3		F2,F3,C4,M4 M6,P6	T4,T12,T13 ,C2,M5,P3, P5		T9
Unlikely	2		T3,T5,T10,F4 ,F5,M2,M3,P 1,P2,P4	E3	T7	
Very unlikely	1	T1,T8,L2,C 1,C3,M1,E 1				
	0	1	2	3	4	5
		Very Low	Low	Moderate	High	Very high

IMPACT URGENCY

Very Likely	5				T9	
Likely	4			T7,E2	F1,L1	T11
Possible	3		T4,M5,P5	T6,T12,T13 ,C2	T2,F2,F3,C4	
Unlikely	2	F3,P1,P2, P3	T3,T5,T10,F3, F5,F6,C4,L2, M2,M4,P4P6		T7	
Very unlikely	1	T1,T8,L2,C 1,C3,E1				
	0	1	2	3	4	5
		Very Low	Low	Moderate	High	Very high

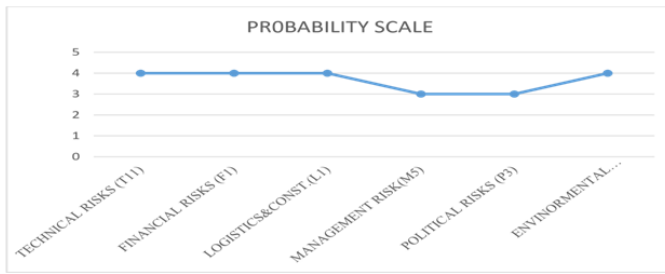
PROBABILITY URGENCY

Very Likely	5					
Likely	4			T7,E2	T2,F3,L1	T11
Possible	3	F3,E3	T4,F2,C4,M4, M5,M6,P5	T12,T13,C2 ,P3	T9	
Unlikely	2	P1,P2	T3,T5,T10,F2, F5,M2,P4	T7,M3	T7	
Very unlikely	1	T1,T8,C1, C3,E1,M1				
	0	1	2	3	4	5
		Very Low	Low	Moderate	High	Very high

PRIORITY URGENCY

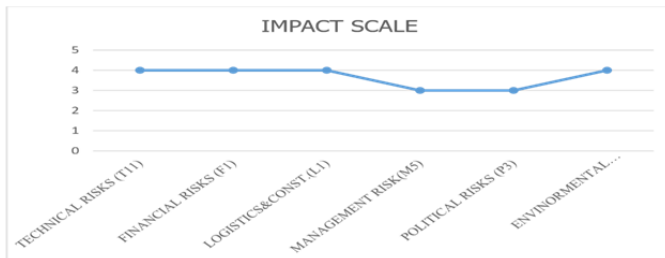
Very Likely	5				T6	T2,T9,L1	T11
Likely	4		T4	T13,C2,P3E 2	F1		
Possible	3		T10,M2,M4	T7,T12			
Unlikely	2	T8,F4	T3,F2,F5,F4,L 2,C4,M5,M6, P4,P5,P6	M3			
Very unlikely	1	T1,C1,C3, P1,P2,E1,E 3					
	0	1	2	3	4	5	
		Very Low	Low	Moderate	High	Very high	

1)Probability scale



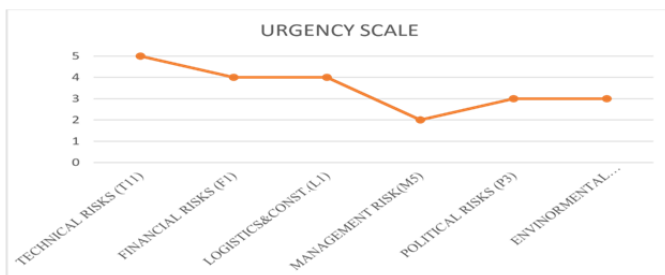
The graph depicts the high likelihood of occurrence of management and political threats.

2) impact scale



In comparison to other risks, the effect of management and political risks is mild, according to the impact scale.

3) urgency scale



The graph shows that technological risk has a very high risk factor urgency value, whereas management risk has a low risk factor urgency value.

4) priority scale



Among the other risk factors, technical risk, logistics risk, and building risk have a high priority value.

V. DISCUSSIONS

• Risk Response Planning for Case Study:

1) Technical risks

- The importance of project scheduling should be stressed.
- The project's goals should be clearly established.
- Set up milestones to monitor the overall success of the project.
- Paying workers' salaries on time.
- Appropriate job assignment for labours.
- Keeping a close eye on the job and payments of subcontractors.
- Determine the potential resources available in accordance with the project schedule.
- A comparison should be made to assess the difference between resource demand and supply.
- Management should make firm decisions on how to handle resources and how to get the most out of them.
- To keep a check on resource productivity, agreements should be made at different levels of work.
- No significant adjustments to the drawing should be made because this causes the contractor's work to be delayed.
- Using appropriate planning and scheduling tools to keep track of the project's overall success.

2) Logistics and construction risk

- To prevent shortages and delays in implementation, procured materials should be shipped well in advance.
- Transport companies should be notified well ahead of time to avoid delays, especially during concrete work.

3) Environmental risks -Weather and seasonal variations

- Early planning to mitigate risk.
- Operations should be scheduled in such a way that they take into account the work's weathering consequences.
- Since the flow of work is constant, the scheduling is performed in such a way that the outdoor works are finished before the rainy season.
- The weather conditions in the area should be thoroughly investigated prior to beginning work.

VI. CONCLUSION

The information was gathered through questionnaire surveys. The strategies for classifying project risks, which have been tailored for construction projects, have been presented from a variety of perspectives by construction companies and firms that may be able to assist in the creation of project management during the planning and construction phases. High risks were labelled on a matrix for probability-impact, impact-urgency, probability-urgency, and priority-urgency. The scope of the project is also expanded to include a case study of an existing project that follows the same risk assessment, risk analysis, and mitigation plan protocol.

The project looked at a variety of risk factors, and the following are some of the findings:

- The risk assessment process begins before the project begins.
- To incorporate best risk management practices, there must be proper cooperation with all parties involved in the project.
- A record of all risks that have arisen and will occur in the future should be kept.
- Any company, large or small, should follow risk management practices to reduce the effects of project risks and their impact on project objectives.
- The project must be well-planned and tracked.
- Workers' wages should not be withheld.
- Supplies should be delivered on schedule on site.

Based on the findings, it is fair to conclude that the majority of construction projects lack a formal risk management policy. Risk assessment is carried out in an informal manner. All risks were recorded, and ratings were assigned based on their likelihood of occurrence, effect on the project, and urgency of resolving each risk.

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