

A Study on Assessment of Risk Analysis for a Civil Project

Manisha Jamgade¹, Mihir S Sheth²

¹Assistant Professor, Department of Civil Engineering, Pillai HOC College of Engineering and Technology Rasayani

²PG Student, Department of Civil Engineering, Pillai HOC College of Engineering and Technology Rasayani, India

Abstract -The construction industry has now turned out to be one of the fastest growing industries of today that has significant effect on the economy of India. Large development projects when deferred cause increment in the general spending plan. The undertaking must be planned and sorted out properly and precisely to finish it inside given time with good quality work. This study specifies that all the construction projects, all over the world, have huge number of risks and to complete the project, efficiently and successfully, risk management is essential. The risks can be recognized by questionnaire survey. The risks are identified and then it is evaluated by various techniques like qualitative analysis to know the occurrence probability of risk and impact of these risks on project goals. When any risk arises, they have severe or simple impact on project and it affects cost, schedule of project, time, and quality. Therefore, for the project to be successful, the risk management is required.

Key Words: Risk Assessment, Project Management, Risk Analysis, Questionnaire Survey

1. INTRODUCTION

The construction industry has now turned out to be one of the fastest growing industries of today that has significant effect on the economy of India. If we were to take a case, in the greater part of the creating nations the primary development exercises which if carried out add to right around 85% of the average capital resources, around 15% of their Gross domestic product, and more than around half of the capital that is been put resources into the fixed assets. The construction business always gives high work openings. Numerous tasks experience both significant time and cost overruns. Large development projects when deferred cause increment in the general spending plan. The undertaking must be planned and sorted out properly and precisely to finish it inside given time with good quality work. This has expanded the competition between the construction firms in the country. The construction firms and the customer's behaviour have made changes because of such events takes place during construction work.

Keeping in mind end goal to build the quality and to lessen cost with enhanced efficiency, there is a requirement for appropriate administration activities that can reasonably and effectively deal with the project. Proper planning and scheduling is a critical part of the project management that will permit finishing the project with the planned budget and on time. Be that as it may, the exercises in the construction industry are subjected to different exercises within the project life cycle and it may even may cause increment in the project cost and furthermore cause delay of the project. Consequently, it is very important to incorporate risk arranging, keeping in mind the end goal to manage different dangers happening in the project. Hence it is very important to accept risk management strategies.

1.1 GENERAL

A project is defined as temporary work which is undertaken to make a unique product, service, or an outcome. The stable beginnings of the project and complete of the project can be demonstrated by temporary features of the project. A project is said to be done only when it has effectively satisfied its objectives.

The result of any project can be:

- i. A fully completed good or a portion of it.
- ii. A capacity to complete all facilities.
- iii. An end outcome that can be a document or a conclusion.

In order to increase the development of various industries and which thereby increases the Gross Domestic Product (GDP) of the country, the development of infrastructure is needed. The enormity of construction sector has associated possibility of various environmental, socio-political, and other unanticipated problems which will cause huge loss to the constructional industry. Therefore, well-organized management of project is required by using all the methods of project management which involves project risk management as an important factor, through the several stages of the project, in order to manage the risks and reduce the cost overruns, time overruns, and quality and safety issues. Risk Management is also necessary for the following reasons:

- i. The construction industry roles in a very indefinite environment where situations can change due to the difficulty of each project, therefore leading to delays of work.

- ii. Through means of Risk Management, possibility of accomplishing project success is very high.
- iii. A Risk Management plan that is established, makes sure that the levels of improbability and risks are correctly managed, so as to complete the project effectively and on decided time.
- iv. It provide practical tools for handling and also reducing the risk identified, before and during the project, in a planned or organized way, so that any possible threat to the liberation of outputs which includes resources, cost, time, quality, and realization of benefits or profits by owner, is suitably managed, to enable that the project is finished successfully.



Fig 2.1 Five Groups of Project Management.

1.2 OBJECTIVE

The study aims at the following objects:

- i. To analyse and make a brief study on various risks those are very often to occur in the construction project.
- ii. Segmenting and classifying the risks depending on the different matrix and then categorize the risk as high, moderate, and low.
- iii. Formulate a risk mitigation plan.
- iv. To make a work to increase the probability of occurrence of positive events by proper prediction of risks.
- v. Providing practical recommendation and ideas for development of the risk management method and develop their performances.

2. PROJECT MANAGEMENT

Project management is the complete application of knowledge, skills, tools and methods to project activities to meet the project requirement. Project management can be accomplished just through the best possible incorporation and reasonable application of the management practices and methods which incorporates 5 processes. The 5 process groups serve as guide to the project to manage the work in more than one way and to properly apply the knowledge and skills required to execute the project.

2.1 PROJECT RISK MANAGEMENT

The Risk management is a method which firms identifies events, prioritizes the events and the moderate adverse effect of uncertainties. Accordingly, risk management is an efficient approach to ease negative consequences of particular phenomenon. The approach that defines risks from only down viewpoint could leads to aversion.

Risk aversion can be a characteristic behavior but in business it is almost impossible to avoid all types of risks. Most risks taking activities are mostly associated with circumstances. Hence, companies need to be very intelligent enough in managing their risks not only to hold the benefit out of it but also to endure in business growth. There are 6 steps in the process of risk management and they are Planning, Risk Identification, Qualitative Risk Analysis, Quantity Risk Analysis, Risk Response Planning and Risk Monitoring and Control.



Fig 2.2 Risk Management Process..

3. METHODOLOGY

The purpose of current work is to study various risk in construction projects and their importance and impact on the project goals and later plan for the risk responses for the evaluated high risks. Here, an effort is made to recognize and evaluate the risk in constructional projects.

In this study, the research methods are used in order to collect the data and analyze the data and report on findings and outcomes. The methodology selected for risk management is distribution of questionnaire survey to the various contractors and clients, consultant of the project. Qualitative risk analysis is used for data analysis.

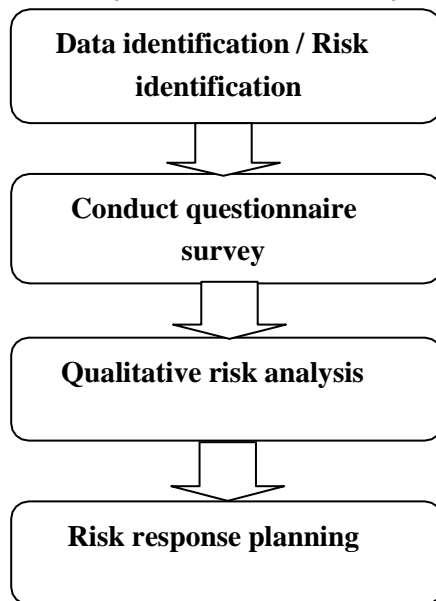


Fig 3.1 Flowchart for methodology

4 CASE STUDY

Company Profile-Rehan Developers: They are is involved in all types of real estate developmental activities. The company is known for contemporary designs, eye catching aesthetics and use of technology. The company is also more reliable and maintains a good relationship with clients.

4.1 PROJECT OVERVIEW

LACASA-The multi-storey residential project LACASA spread over a land of 6 acres situated in Maharashtra. LACASA is a residential project consisting of 16 floors including penthouses. The building is divided into three wings namely A, B and C respectively.

The ground floor of LACASA consists of an amenities floor which consists of a gym, party hall, a mini theatre, indoor games just to name a few. A swimming pool is constructed behind the C wing of the building.

4.2 RISK AT SITE

The project was planned for only construction of apartments. The work in the beginning was carried out at a good pace but currently the work flow is considerably low due to demonetization and increased taxes (GST) levied in the construction field which includes materials. Changes in the plan at the ground floor leading to construction of double height of slab, lead to additional expenses of more than 50 lakhs and other miscellaneous activities.

5. RESULT AND DISCUSSION

5.1 RESULTS OBTAINED FROM QUESTIONNAIRE SURVEY

In the following tables, following are the abbreviations:

- P - Probability,
- I - Impact,
- U - Urgency,
- PR - Priority

Table 5.1 Technical Risks

SL.No.	RISKS	P	I	U	PR
1	Type of contract	2	2	2	3
2	Project preliminary plan	3	4	4	4
3	Delays occurs in design and drawings than expected	3	4	4	4
4	Managing resources	4	4	4	4
5	Inadequate investigation on site	3	4	4	3
6	Unknown productivity of resources	3	4	4	4
7	Changes in project scope and requirement	2	3	3	3
8	Design errors and faults	3	4	4	4
9	Subcontractors	2	2	2	2
10	Insufficient contractor experience	2	2	2	3
11	Failure to carry work as per planning, scheduling	2	3	3	3
12	Improper scheduling and delay of contractor	3	4	4	3
13	Controlling and monitoring and execution	2	3	3	3

Table 5.2 Financial Risks

SL.No.	RISKS	P	I	U	PR
1	Investment on projects	2	2	3	3
2	Availability and undulation in foreign exchange				
3	Delays in worker wages	3	4	4	4
4	Increase in cost of materials	3	4	3	4
5	Releasing of funds	2	2	3	3
6	Import procedures	2	2	2	3

Table 5.3 Logistics and Constructional Risks

SL.No.	RISKS	P	I	U	PR
1	Non availability of transportation services	2	3	2	2
2	Difficulties in disposing plant and equipment's	2	2	2	2
3	Unfamiliarity with local bodies	2	2	3	2
4	Demands on use of local firms and agents	2	2	2	2
5	Technologies	2	3	3	3
6	Absence of protection on construction site	3	4	4	3

Table 5.4 Management Risks

SL.No.	RISKS	P	I	U	PR
1	Company relation problems	1	1	2	2
2	Inadequate assigning works	2	2	2	3
3	Unsatisfactory skilled staff	2	2	2	3
4	Uncertainty about relationship between project employees	2	2	2	2
5	Clashes between project group	1	2	2	2
6	Resource allocation	2	2	3	3

Table 5.5 Environmental Risks

SL.NO.	RISKS	P	I	U	PR
1	Natural disasters				
2	Weather and seasonal variations	3	4	3	3
3	EIA reports				

Table 5.6 Political Risks

SL.No.	RISKS	P	I	U	PR
1	Before tendering	2	2	2	2
2	Acceptance of contract	1	2	2	2
3	Public complaints	2	2	2	2
4	Finalization of contract	1	1	1	2
5	Resident tolls	1	2	2	2
6	Permissions, clearance, approvals	3	4	4	3

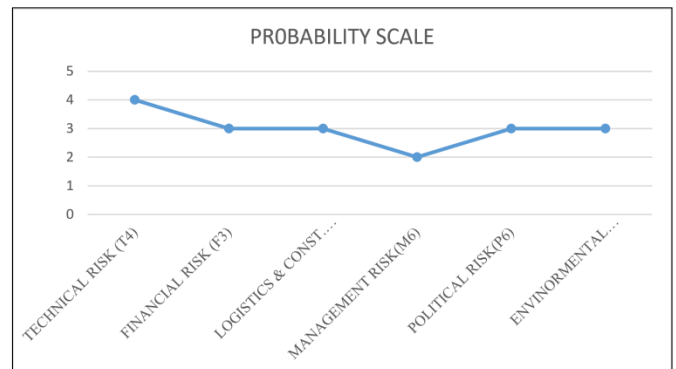


Fig 5.1: Probability Scale graph

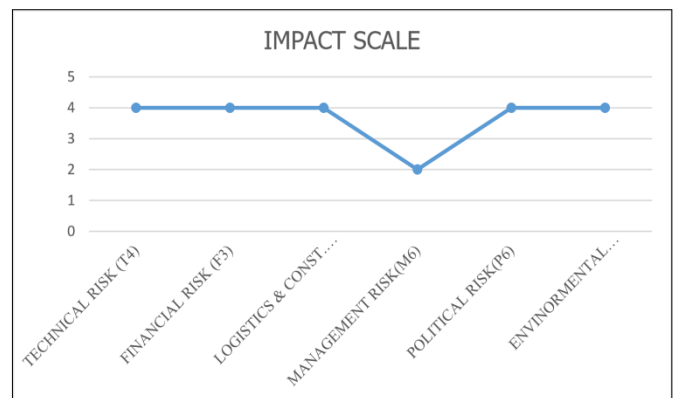


Fig 5.2: Impact Scale graph

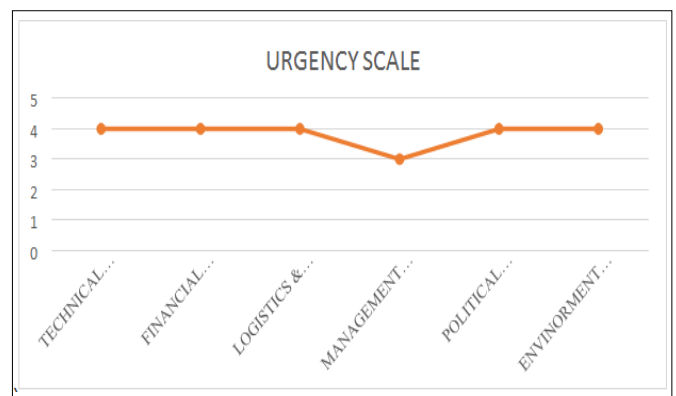


Fig 5.3: Urgency Scale graph

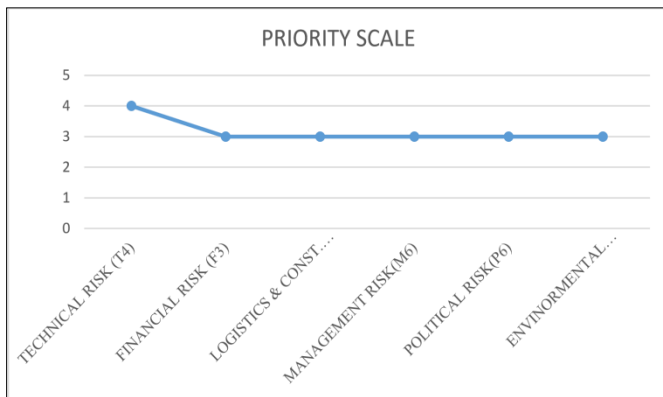


Fig 5.4: Priority Scale graph

5.2 RESULTS OBTAINED FROM CASE STUDY: LACASA

Table 5.7 Technical Risks

SL.No.	RISKS	P	I	U	PR
1	Type of contract	1	1	1	1
2	Project preliminary investigation	4	3	4	5
3	Delays occurs in design and drawings than expected	2	4	3	3
4	Managing resources	3	5	4	5
5	Inadequate investigation on site				
6	Unknown productivity of resources	2	2	2	3
7	Changes in project scope and requirement	3	3	2	4
8	Design errors and faults	2	2	2	2
9	Subcontractors	4	3	3	5
10	Insufficient contractor experience	1	1	1	2
11	Failure to carry work as per planning, scheduling	4	4	5	5
12	Improper scheduling and delay of contactor	3	3	3	3
13	Controlling and monitoring and execution	3	3	3	4

Table 5.8 Financial Risks

SL.No.	RISKS	P	I	U	PR
1	Investment on projects	4	4	4	4
2	Availability and undulation in foreign exchange	3	2	2	3
3	Delays in worker wages	3	2	2	2
4	Increase in cost of materials	3	2	1	2
5	Releasing of funds	2	2	2	2
6	Import procedures	2	2	2	2

Table 5.9 Logistics and Constructional Risks

SL.No.	RISKS	P	I	U	PR
1	Non availability of transportation services	4	4	4	5
2	Difficulties in disposing plant and equipment's	1	1	2	2
3	Unfamiliarity with local bodies	1	1	1	1
4	Demands on use of local firms and agents	3	3	3	4
5	Technologies	1	1	1	1
6	Absence of protection on construction site	3	2	2	2

Table 5.10 Management Risks

SL.No.	RISKS	P	I	U	PR
1	Company relation problems	1	1	1	1
2	Inadequate assigning works	2	2	2	3
3	Unsatisfactory skilled staff	2	2	3	2
4	Uncertainty about relationship between project employees	3	2	2	3
5	Clashes between project group	3	3	2	2
6	Resource allocation	3	2	2	2

Table 5.11 Environmental Risks

SL.NO.	RISKS	P	I	U	PR
1	Natural disasters	1	1	1	1
2	Weather and seasonal variations	4	4	3	4
3	EIA reports	3	2	1	1

Table 5.12 Political Risks

SL.No.	RISKS	P	I	U	PR
1	Before tendering	2	2	1	1
2	Acceptance of contract	2	2	1	1
3	Public complaints	3	3	3	4
4	Finalization of contract	2	2	2	2
5	Resident tolls	3	3	2	2
6	Permissions, clearance, approvals	3	2	2	2

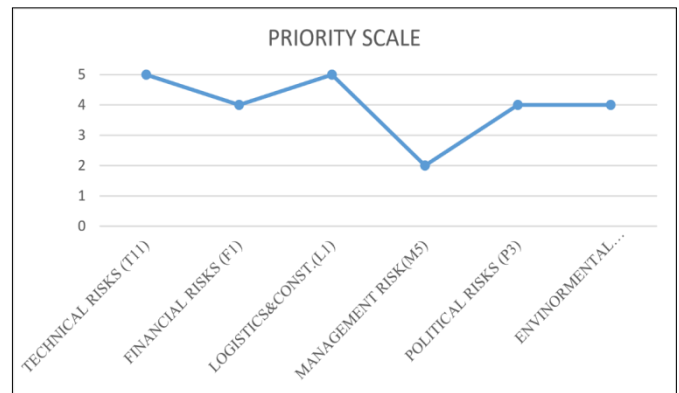


Fig 5.8: Priority Scale graph

6. CONCLUSIONS

The results were obtained through questionnaire surveys conducted. The methods to classify project risks, that have been particularized for construction projects, have been presented from various point of view from construction companies and firms that may be helping the development of dealing with project in the planning and construction stages. The project has studied various factors related to risks and some of outcomes are listed below:

- i. The risks management process starts prior to project itself.
- ii. There must be proper coordination between every distinct involved with project to implement better risk management practices.
- iii. Record of all the risk occurred and occurring, occurs in future should be maintained.
- iv. Every organization big or small should be adopt risk management practices to reduce effect of risks arising in the project and its impact to reach the project goals.
- v. The project should be properly scheduled and monitored.
- vi. Clear understanding of the project scope explaining of the complete outcome of project.
- vii. Repetitively changes in design should be avoided in the projects.
- viii. Wages of the workers should not be delayed.
- ix. Procurement of materials should be timely on site.

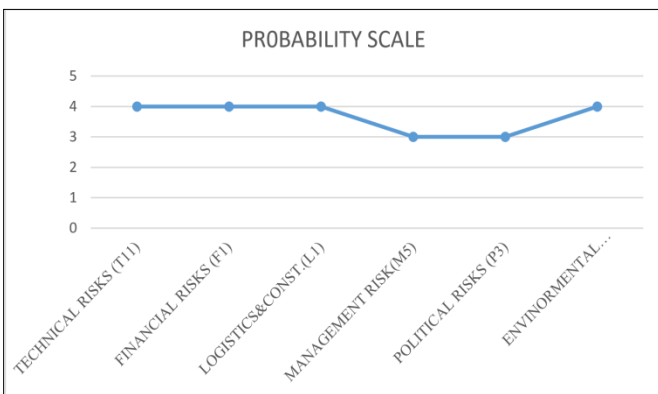


Fig 5.5: Probability Scale graph

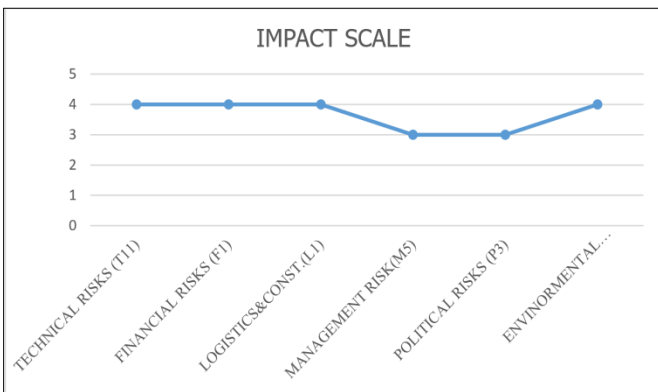


Fig 5.6: Impact Scale graph

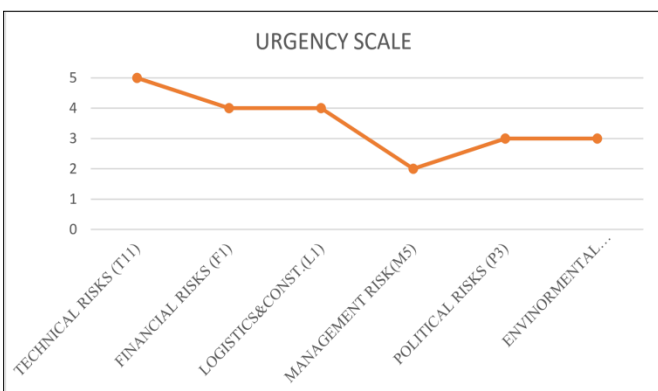


Fig 5.7: Urgency Scale graph

From the results, it is safe to say that majority of the construction projects have no systematic procedure in place to deal with risks. Risk management is done in a very informal mode. All the risks were recorded and ratings were given for their probability of occurrence, its impact on the project and urgency of resolving particular risk.

7. REFERENCES:

[1] Pawelszymanski "Risk Management in Construction Projects" EURO working group Operational Research in Sustainable Development and Civil Engineering 2nd International Workshop on Flexibility in Sustainable Construction, 24-26 April, PP 174-182, 2017.

[2] Agnieszka Dziadoz, MariuszRejment "Risk analysis in Construction Projects-Chosen Method", Operational Research in Sustainable Development and Civil Engineering – Meeting of Euro Working Group and 15th German-Lithunain-Polish colloquium, PP 258-265, 2015.

[3] Absulmaten Taroun, "Towards a Better Modelling and Assessment of Construction Risk", Journal of Civil Engineering Research, 4(2A),volume 32, PP 101-105, 2014.

[4] Ana I, Irimia-Dieiguez, Alvaro Sanchez-carzola, Rafaela Alfalla-Luque "Risk Management in Megaprojects", Science Direct Procedia – Social and Behavioural Sciences, vol.119, PP 407-416, 2014.

[5] Kinnaresh Patel "A study on Risk Assessment and its Management in India", American Journal of Civil Engineering. Vol. No 1, Vol. No. 2, PP. 64-67, 2013.

[6] J.G Perry, R.W. Hayes "Risk management in Construction Projects", Asia-Pacific Journal of Management Research and Innovation, Volume: 7, issue: 3, PP: 107-120, 2011.

[7] M.J. Mawdesley "Perception of Human Risk Factors in Construction Projects: An Exploratory Study", Article in International Journal of Project Management 22 (2):131137, volume 22, PP 131-137, 2004.

[8] He Zhi "Risk Management for Overseas Project Management", International Journal of Project Management, Volume 13, PP 231-237.

[9] Pattel Ankit Mahendra Et.al "Risk Analysis in Construction Projects, -Chosen Methods", Internet source.