

Risk Management in Construction Industry-Materials

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Abstract-Risk management is very popular concept in a number of businesses. For improving the performance and increase the profits many companies often establish a risk management procedure in their projects. Construction sector is widely complex and have often considerable budgets, and thus reducing risks associated with projects should be a priority for each project manager. The main purpose of this project is to identify the key risk factors in materials and material management that affect construction project. A questionnaire has been prepared incorporating of near about fifty different questions. Various construction sites were visited for questionnaire survey. The sheet of questionnaire comprises of Likert scale to measure risk factors in materials by obtaining rating on the basis of Likelihood and Impact from the Site Engineers or Project Engineers. Statistical Package for the Social Sciences (SPSS) software was used for analysis of various risk factors from Questionnaires survey data for preventive measures or mitigation techniques for various risks on construction site.

Index Terms-Risk Management1, Materials, Likert scale, Statistical Package for the Social Sciences Software.

1. INTRODUCTION

The Construction industry is largest economic outflow in India. According to eleventh five year plan, it is the second largest economic activity after agriculture. Every construction activity no matter what its size and complication comprises risks, which might vary in the final result on Project. Risk management is the systematic process of identifying, examining, and responding to project risk. It includes maximizing the possibility and consequences of positive events and minimizing the likelihood and consequences of contrary events to meet the project objective. The accomplishment or failure of any project depends significantly on how we recognize and deal with the risk factors which affect construction of our project.

Materials management is a significant element in project management. It is crucial factor adversely affecting the performance of construction projects. Material is the main component in any of the construction projects.

In recent developments a wide range of building materials is available for the construction of civil engineering structures. The total budget of materials may be up to 60% or more of the total budget incurred in construction project dependent upon the type of project. Therefore, if the material management in

construction projects is not managed properly it will generate a major cost variance in project. The total budget of the project can be well controlled by taking remedial measures towards the cost variance befall in the project. Effective construction materials management process is a key to success of a construction project. The effective material Management is a key of Success in Construction industry.

2.1 RESEARCH IMPORTANCE

The management of risks is a vital issue in the forecasting and management of any project. Construction industry has more risk and uncertainty than many other industries. The process of taking a project from primary investment appraisal to accomplishment and into use is a complex process. Construction industry in India has lack of knowledge about risk management comprising risk identification, analysis and assessment, and that is why this research is important, where it will discover the risk factors In the Materials Management in India and determine the importance of each factors in terms of severity and allocation.

2.2 RESEARCH AIM

This research sets visions on introducing the risk management in building projects from the Contractors and owners' perspectives and identifies key risk variables and their effects on the projects and to achieve and maintain reduced cost of material risk in construction projects.

3. LITERATURE REVIEW

Risk management is most likely the most difficult aspect of project management. A project manager must be able to recognize and identify the source causes of risks and to trace these causes through the project to their consequences. Furthermore, risk management is the key aspect in construction process to identify and analyze risks so that proper steps should be taken to minimize risk and neat use of available resources. The use of risk management from the starting of any project, where major decisions such as choice of arrangement and selection of construction methods and required resources can be influenced, is essential. Risk management is beneficial for identifying and analyzing risks and it can help in improvement of construction project management processes and effective use of resources. Construction projects are unpredictable because of number of activities involved at every stage of construction. Risk management is an important process which is helpful to achieve project objectives in terms of quality, time, safety, and cost. Project risk management is frequent process which is beneficial if implemented properly and in systematic manner throughout the project lifecycle, from early stage to the completion of the project to achieve project objectives.

Many Authors described the risk analysis and management techniques in detail to minimize project risks. A typical risk management process includes the following key steps:

1. Primary stage

- Risk Identification

The risk identification may be considered as the most important stage in Risk Management. It is helpful in determining where the risk has occurred and how to mitigate it. Brainstorming, Delphi technique, interview/expert opinion, past experience, checklists etc. were used for risk identification.

2. Secondary stage

- Risk Assessment

It is the process of estimating and communicating material risk and decides whether this factor is acceptable or not. Risk assessment is done by making valuable judgments from past incidents and experiences.

- Risk Analysis

The data or information which has been collected from the assessment is analyzed by using various techniques and software.

3. Tertiary stage

- Risk Mitigation

The uncertainty of risk events and occurrence should be minimized by using various mitigation techniques and methods.

4. METHODOLOGY

As described above, it is clear that the nature of the research is to identify potential problems before they occur so that risk-handling activities may be planned and raised as needed across the life of the product or project to mitigate adverse impacts on achieving objectives. Therefore, Identification of risk sources provides a base for systematically examining changing situations over time to uncover situations that impact the ability of the project to meet its objectives. Risk sources can be identified as both internal and external to the project. As the project progresses, additional sources of risk may be recognized. Forming categories for risks provides a mechanism for collecting and organizing risks as well as safeguarding appropriate scrutiny and management attention for those risks that can have more serious consequences on meeting project objectives. After Identification of Risk sources and factors, Parameters for evaluating, categorizing, and prioritizing risks generally include likelihood (i.e., the probability of risk occurrence), risk consequence (i.e., the impact and severity of risk occurrence). Risk constraints are used to provide common and consistent criteria for comparing the various risks to be managed. Without these constraints, it would be very difficult to gauge the severity of the unsolicited change caused by the risk and to prioritize the necessary actions required for risk mitigation planning questionnaire Survey was developed by researchers of this paper used to measure the two factors likelihood and impact. All questionnaires listed in table are self-assessed and use a Likert scale response format. The Questionnaires are due filled From Respective Project Manager or Senior

Engineer available during the visit at respective project. All project recruits who were working on construction projects at the time of the survey were invited to participate in the survey. All the Valid Responses given by the Representatives are the input or data was to be analyzed further. The hypotheses were verified using Statistical Package for the Social Sciences (SPSS) method to analyse the data collected from the survey. SPSS is a statistical methodology that takes a hypothesis-testing approach to the statistical analysis of a numerical data. This software allows examination the various factors affecting the project development. After analysis, result obtained from the software is identified and various mitigation and control techniques are concluded for the affecting factors obtained from SPSS.

5. ANALYSIS AND RESULTS

The figures below shows the analysis of results, the analysis was done using SPSS software in which the Response Percentage for each risk factor was obtained.

5.1 Risk in Material treatment

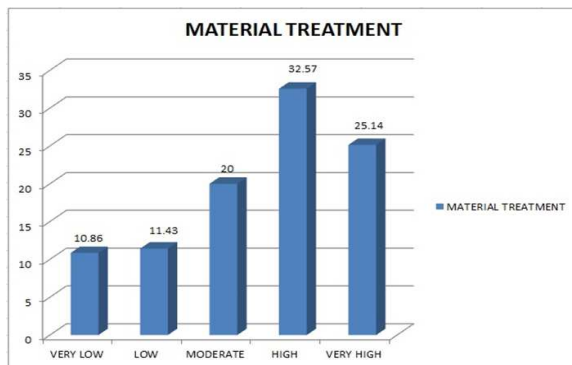


Fig 5.1, Risk in material treatment

From fig no 5.1, it can be interpreted that 32% respondents strongly agreed that improper material treatment causes risk in construction project. While 25% respondents agreed that improper material treatment has very high impact on construction of project.

5.2 Risk in Material Usage

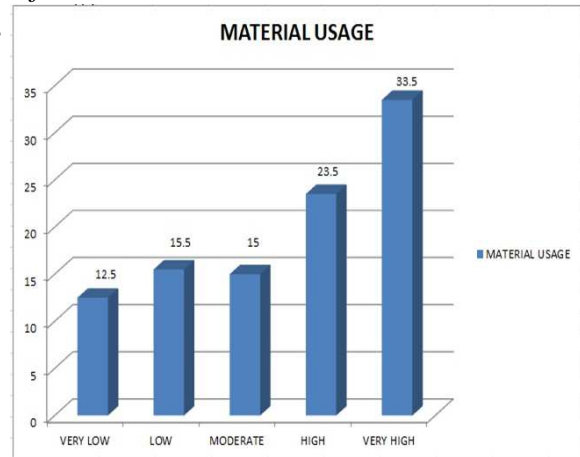


Fig 5.2, Risk in Material usage

From above fig no 5.2, it can be concluded that 33% respondents strongly agreed that inadequate usage of material has very high impact on construction project. While 23% respondents agreed that improper material usage has a High impact on construction project.

5.3 Risk in Procurement Process

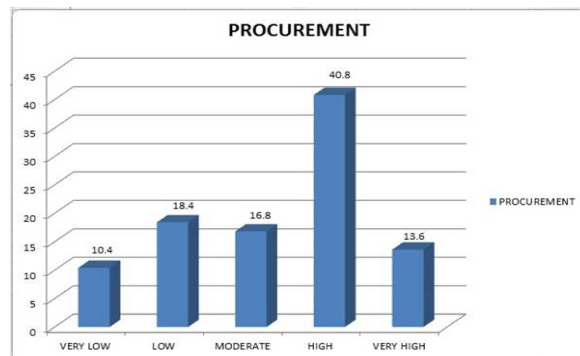


Fig 5.3, Risk in Procurement Process

From fig no 5.3, it can be concluded that 40% respondent strongly agreed that inadequate planning of procurement process causes risk in construction of project. Since it scores highest response from the survey conducted.

5.4 Risk in Tendering Process

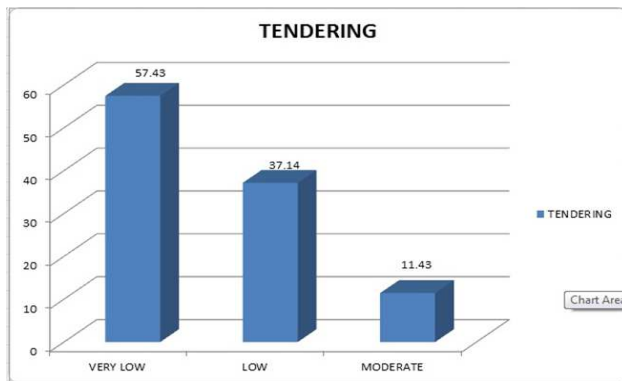


Fig 5.4, Risk in tendering process

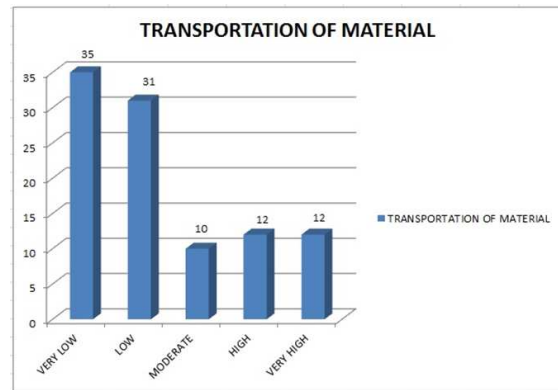


Fig 5.6, Risk in Transportation of material

From fig no 5.4, it can be interpreted that near about 57.43% of the respondent strongly agreed that tendering process causes very low Impact on construction project, while near about 37% of the respondent agreed that it is low and 11% of respondents are moderate. It can be concluded base on the respondent’s responses that there is very low impact of tendering process in construction project but it cannot be neglected.so it should be considered while planning any construction project.

From the above fig no 5.6, It can be interpreted that 35% repondents agreed that transportation of material has very low impact on construction project.while 12% agreed that it has very high impact on construction project.

5.5 Risk in Supply of Material

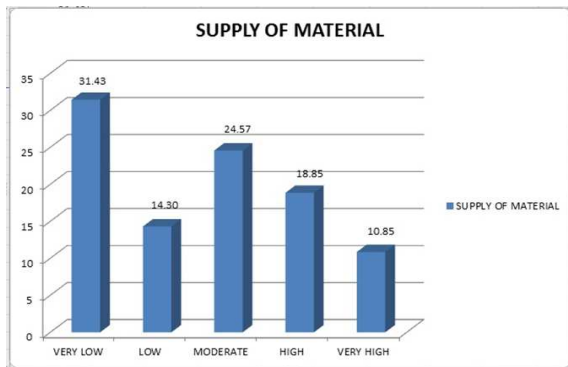


Fig no 5.5, Risk in Supply of Material

From above fig no 5.5, It can be concluded that near about 18% repondents agreed that the supply of material affects Construction project.while 24% repondent are moderate and 11% repondents agreed that it has very high impact on construction project. So adequate steps should be taken to minimize the risk.

5.6 Risk in Transportation of material

6. Tables

Table no 1, Indicates the parameter for likert scale.

Rating	Rating wise Likelihood	Rating wise Impact
1	Rare	Very low
2	Occasional	Low
3	Somewhat Frequent	Moderate
4	Frequent	High
5	Very Frequent	Very high

Table no 2, Denotes sample Questionnaire Survey.

Sr.no	Description	Likelihood	Impact
1	Do you think tendering process has a risk?	1	2
2	Do you think defective supply and usage of material is risky?	5	4
3	Do you think material handling while transportation has a risk?	3	3

4	Do you think improper resource management has a risk?	4	5
5	Do you think unstandardized method for material treatment has a risk?	3	4
6	Do you think Improper Quantity /Mix proportion has a risk?	4	5
7	Do you think improper Inspection has a risk?	2	4

7. CONCLUSION AND RECOMMENDATIONS

Risk management in construction of any project is very important and it should be prioritize by every construction project. The success of every construction project mostly is determined by the ability of the construction team to minimize the risk factors and the implementation of the project should be proper. it is conclusively identified that proper material treatment, Adequate material usage and proper planning for procurement of material are among the forefront factors for success that mitigate the amount of risk in construction project under the period of the study. Basically efficient use of resources weighs more in the success of project and Saves time and Cost required for Construction Projects.

Therefore, to eliminate the number of risks usually encounter during construction of project one have to fully identify the factors that causes risk in construction of project and a possible process of mitigating them. For a project to be successful the following recommendations are hereby presented:

- Adequate planning should be provided before the commencement of project construction.

- Safety, rules and regulations in construction site should fully be maintained from the initial to final stage of construction.
- Durable and quality materials for construction should be supply and use properly.
- Efficient and Economical use of all the available resources should be adopted by all associates of construction team.
- Material usage, material treatment, material procurement and all other needed equipment should be used for effective utilization.
- Effective communications and corporations between all members of construction team should be adopted.
- Well trained and experienced workmen should be employed where necessary.

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