



RISK MANAGEMENT IN CONSTRUCTION PROJECTS - MATERIALS AND MATERIAL MANAGEMENT

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Abstract-Construction projects are facing a greater number of uncertainties and more severe risks, which could cause negative impact on project such as time, cost and quality, resulting losses in project. This study focuses on the risk management in construction project with respect to materials and material management, wherein six major ongoing projects in Goa were selected for case studies. The Four main objectives of this study were to identify key risk factors, Identify risk frequency & risk impact, Categories risk and suggest remedial measures to overcome these risks. This study will be based on findings of a questionnaire-based survey, the questionnaires will be designed / prepared based on the knowledge obtained from the relevant literature reviews and in consultation with the project managers / heads of construction sites. All the questionnaires are self assessed and use a Likert scale to measure risk factor by obtaining rating on the basis of likelihood from the Project Engineering team.

Key words- Risk Management, Risk identification, Risk Classification, Risk categorization, Remedial measures

I. INTRODUCTION

Risk is an uncertain event or condition that if it occurs has an negative impact, which cause a loss in a construction project. Risk management is the process of identification, classification, assessment and mitigation. Risk management is a concept which is used in all industries, each industry has developed their own research management standards, but the general ideas of the concept usually remain the same regardless of the sector. According to the Project Management Institute, risk management is one of the nine most critical parts of project. This indicates a strong relationship between managing risks and a project success.

In construction projects material is the main component, the total budget of materials itself about 60% or more of the entire budget of the project. Therefore, the material management is a significant element in project management, if the material management is not managed properly it will generate a major cost variance, affect schedule and quality of the project.

In present scenario due to scarcity and competitiveness, the availability of construction materials in the market is becoming very difficult and also on time delivery and quality of the materials will not be as per expectations. Hence the project management needs to have proper planning on material requirement, procurement, storage and usage of the materials.

II.LITERATURE SURVEY

Title: Risk management in Construction projects

Author: Pawel szymanski

He studied identification of project risks, based primarily on determining what its type may affect the project, together with an indication of their characteristics parameters, and estimating the probability of its occurrence on the project. He concluded that to wisely manage risk does not mean to avoid it but to identify it correctly.

Title: Risk management in construction projects: a knowledge based approach

Author: Alfredo Federico Serpella Ximena Ferrada, Rodolfo Howard, Larissa Rubio

They studied the problem of risk management in construction projects using knowledge based approach and proposes a methodology based on a threefold arrangements that includes the modeling of the risk management function, its evaluation and the availability of a best practices model. They concluded that the risk management in the construction projects is still very ineffective and the main cause of this situation is the lack of knowledge.

Title: Risk management of construction works by means of the utility theory

Author: Oleg Kaplinski

In this paper a suggested method of risk analysis has been presented, based on the application of utility theory. He concluded that this process significantly changes the approach to analysis risk.

Title: Research on risk management of railway engineering construction

Author: WANG Lin, LI Yaqib, WANG Enmao

This paper describes a simple and effective risk management process in an actual project , uses the fault tree to identify the key risk and concluded that risk management is a practical method in the construction phase of rail road engineering practitioners in making effective plans for productivity improvement.

Title: Applying risk management workshop for a public construction projects

Author: Cheng Siew Goh, Hamzah Abdul-Rahman and Zulkiflee Abudal Samad

This paper aims to explore how a risk management workshop can be effectively used in managing project risk. By studying a risk management workshop that was conducted in a public project. An in-depth case study approach was adopted to identify the benefits and challenges of this method of risk management. The output of the workshop can be used as a lesson about improving risk management implementation.

Title: Professional Risks in construction Industry

Author: S.S. Timofeevaa, D.V. Ulrikhb, N.V. Tsvetkuna

This paper analysis the occupational risk assessment methods recommended in the normative documents and scientific publications. According to assessment results, it was found that electric and gas welder, bricklayer, concrete worker and carpenter are the most hazardous professions of the construction industry.

Title: Risk management in Construction Industry – Materials

Author: Nikhil Bhoir, Somnath Munde, Prasad Birajdar, sagar Bharane, Gaurang Sangle

This study aims to identify key risk factors in materials and material management that affects construction projects. They have concluded that proper material treatment, adequate material usage, and proper planning for procurement of material are among the major factors for success of project.

III. PROBLEM STATEMENT

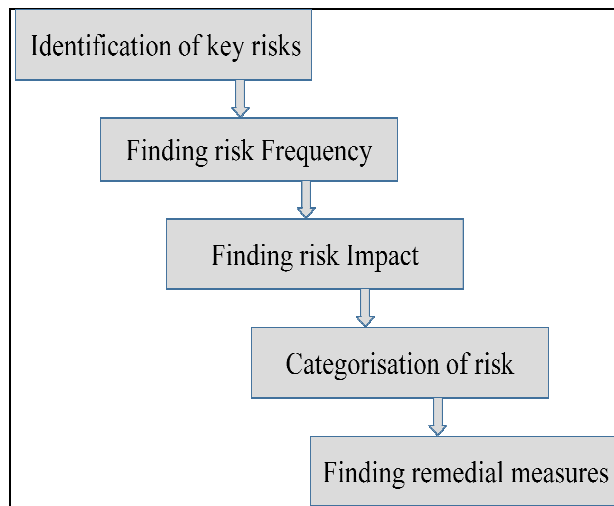
- Material is the main component of any project; about 60% of total cost of project is of materials itself.
- Therefore, if the material management in projects is not managed properly it will generate a major cost variance and negative impact on schedule.

- Due to rapid infrastructural growth there is a scarcity of materials in the market which leads to delay in supply and increase in cost of materials
- Hence the project management needs to have proper planning on procurement, storage and usage of the required materials to avoid uncertain risk.

IV. OBJECTIVES

- To identify key risk factors of the project
- To identify Risk frequency and Risk impact
- To categories the risk
- To suggest effective remedial measures for overcoming the risk factors.

V. METHODOLOGY



5.1 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. To identify the key risks, the questionnaires are valuable method of collecting wide range of information from large number of individuals from construction project site often referred to as respondents. The questionnaires will be designed / prepared based on the knowledge gain from the relevant literature reviews and in consultation with the senior staff of project team. All the questionnaires are self assessed and use a likert scale response format. The questionnaires format are of two part, in first part it consist of respondents information for example respondents name, company name, current position, experience in construction projects ,type and cost of project. In second part the list of risk factors with five options of most likely risk where in the respondents will be asked to rate their level of agreement /views. The mean values will be calculated and Relative importance index is obtained by using below given formula accordingly the risks will be ranked.

$$RII = \frac{\sum w}{A \times N} = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + n_1}{A \times N}$$

For the research major projects in Goa were selected they are, Cable stayed bridge project, Hotel project (Five Starred Category), Residential, Commercial, Industrial and Hospital project. All the professionals of construction industry were considered for the survey to get fair result of the research (i.e., Consultants, Architects, Contractors, builders and clients)

5.2 Finding Risk Frequency and Risk Impact

The key risks will be further sent through e - mails to all the working professionals of the respective project i.e., Project head, Project manager , Purchase Manager, Project Engineers,& Stores officers etc..

A Likert scale of 1 to 5 will be used for analysis of risk Frequency and risk Impact. A likert scale is a type of psychometric response scale questionnaire and is most widely used in survey research. When responding to a Likert scale questionnaire item, respondents specify their level of agreement to a statement.

5.3 Risk Categorisation:

The risks will be categorised as high risk, medium risk and low risk as per their risk exposure value. The risks exposure value is obtained from risk frequency and impact, (Risk Exposer = risk frequency x risk impact)

5.4 To Find effective remedial measures to overcome the risk

Consultations with the senior project professionals and experts interview will be carried out to suggest remedial measures to overcome the risks.

VI.CONCLUSION

Risk management is one of the critical and very important elements of the construction project. Effective risk management practices in project controls the cost, quality and time. In construction project the material is the main component, its budget itself about 60% or more of the total budget of the project. Hence materials management is essential component of any successful project execution. If the material management is not managed properly, it will generate a major cost variance, affect schedule and quality of the project. Hence the project management needs to have proper planning on material requirement, procurement process, storage and usage/handling of the materials.

The basic idea of the research is to study various risk factors and to find out remedial measures overcome the risk which has negative impact of the project.

This study will assist the project management to identifying the major areas of risk and to take better decisions in planning the project.

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