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Study and investigation on risk analysis in construction industry using SPSS

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ABSTRACT

Risk management is about thinking ahead and preventing things from going wrong. Managing risks in construction projects have been recognized as a very important process in order to achieve project objectives. The Construction projects have several characteristics such as specific objects time limit financial constraints and economic requirements, special organizational and legal conditions, complexity and systematic characteristics, For that each investment project itself is a complex system. Especially for the construction projects, there are many risk facets and complicated relations, which will influence it. The complicated relations include direct, indirect, obvious, implicit or unpredictable, What's more, the various risk factors will cause different severity of the consequences. If you do not consider these risk factors, or ignore the major factors, they all will cause damage because of decision-making errors. Quality targets, time targets, cost targets are the three objectives of project management. Especially in the construction project, the time objective is closely and inseparably related to the cost objective. Therefore, risk management of construction period is a key part in the risk management of construction. Purposes of the study is risk analysis management technique which includes well documented procedures for the one stop solution all types of hazards most likely to occur during any construction project. Primavera.

Index terms: Risk, Risk analysis, Risk management, SPSS, Construction Projects

INTRODUCTION

Construction industry is considered as one of the most complex industrial sector. It is because of the reason that construction projects involve a variety of complex processes working simultaneously. Proper management of all these processes is quite challenging for the management team. Risk is nothing but the threats that occur during the project life cycle. Risk may be of various kinds. Risk can be defined as the event that negatively affects the project objectives. These risks from a wide variety of sources, including financial uncertainty, legal liabilities, strategic

management errors and natural disasters. Risk management allows organizations to attempt to prepare for the unexpected by minimizing risks and extra costs before they happen. Risk analysis is regarded as the procedure involving the evaluation of prospective risks, arranging them according to importance, and allowing the team to select the important ones. Hence it is important to implement proper risk management in every construction project. Risk management is not a simple process. It involves various complex steps. The most important steps in risk management are risk identification and risk assessment. Various methods can be used for risk assessment.

AIM & OBJECTIVE

This study aims to assess and rank various risks in construction projects. This will help to conduct various researches to reduce the impact of construction risks in future. The main objective of this study is to identify and control the possible future risk proactively rather being reactive. To spread awareness regarding risk management in the construction industry. Main objectives are:

- The risks in construction project are identified through questionnaire surveys.
- Identified risks are assessed by SPSS software
- Risks factors then ranked according to their priority, which will help to know

about the severity of each risk.

- To suggest effective management techniques for preventing the risk during construction.

METHODOLOGY

Through literature study, type of risk included in construction site is found. Then factors for risk analyse was identified. Then the questionnaires were prepared on impact of risk and probability of occurrence of risk. Then the data were collected from various personnel from the construction industry with ample amount of experience. After that, the data were analyzed with Statistical Package for Social Studies (SPSS) software.

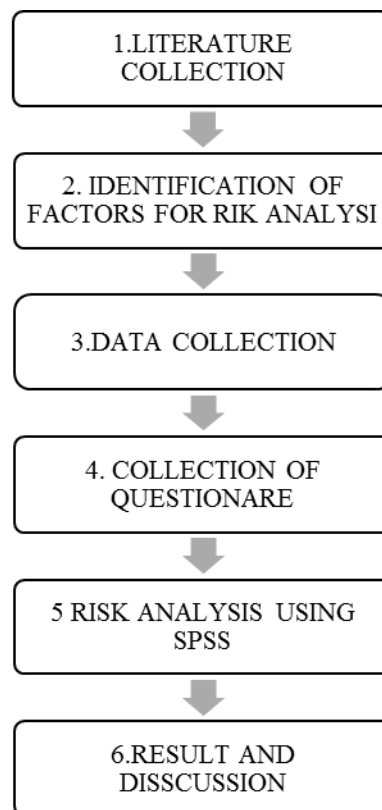


Figure 1 Step by step process of methodology

DATA COLLECTION

The questionnaire survey were collected from the various construction projects by mail or by personnel meeting. The questionnaires was tested with a pilot survey for clarity, ease of use, value of

the information that could be gathered. The questionnaire survey is divided into two parts. The first part consists of general information like type of company, experience, etc., and the second part consists of the construction risk factors.

ANALYSIS AND FINDINGS

Data analysis is done by using SPSS software. SPSS is a Windows based program that can be used to perform data entry and analysis

Risk involved in the construction industry

The risk is divided into seven main groups. Namely financial risk, construction risk, environmental risk, political risk, legal risk, management risk, physical risk and design risk.

Table -1: Statistical Analysis in Risk Factor

Sl.No	Description of risk	Mean
TECHNICAL RISK		
1	Inadequate site investigation	4.612
2	Inefficient design	4.224
3	Improper project planning and budgeting	3.905
4	In adequate specification	2.806
CONSTRUCTION RISK		
5	Quality of material and equipment	4.545
6	Equipment failure	3.078
7	Inefficient labor	3.723
8	Poor workmanship	3.745
9	New technology implementation failure	3.809
FINANCIAL RISK		
10	Loss due to rises in material/equipment prices	3.526
11	Loss due to variations in interest rates	3.724
12	Tax rate variation	4.312
13	Payment delays	3.865
LOGISTICAL RISK		
14	Insufficiency of raw materials	3.973
15	Non availability of operators	3.964
16	Insufficient technical units	3.857
ENVIRONMENTAL RISK		
17	Nature disaster (Floods ,Earthquakes etc...)	3.894
18	Adverse weather conditions	4.642
19	Accessibility	3.463
TIME RISK		
20	Compressed time schedule	3.584
21	Inappropriate time allocation	3.062
SOCIO-POLITICAL RISK		
22	Changes in laws and regulations	4.074
23	Customs and import restrictions	3.877
MANAGEMENT RISK		
24	Improper actions	4.475
25	No past experience in similar projects	3.084
26	Internal management problems	3.188
SAFETY RISK		
27	Fire hazards	3.017
28	Accidents on workers	3.623

FREQUENCY ANALYSIS

Frequency Analysis is used to find out the detailed information about each variable entered into a spreadsheet.

Table 2 Designation

			Valid Percent	Cumulative Percent
	Frequency	Percent		
General Manager	2	2.6	2.6	2.6
Project Manager	5	22.0	22.0	22.6
Project Engineer	8	27.0	27.0	51.6
Assistant Engineer	3	4.6	4.6	56.1
Site Engineer	15	40.5	40.5	96.8
Quantity Surveyor	2	1.8	1.8	98.7
Planning Engineer	1	1.4	1.4	100.0
Total	36	100.0	100.0	

Table 3 Experience

			Valid Percent	Cumulative Percent
	Frequency	Percent		
<5years	1	1.3	1.3	1.3
5-10	3	3.9	3.9	5.2
11-15	6	7.7	7.7	12.9
16-20	10	49.0	49.0	61.9
>20	16	38.1	38.1	100.0
Total	36	100.0	100.0	

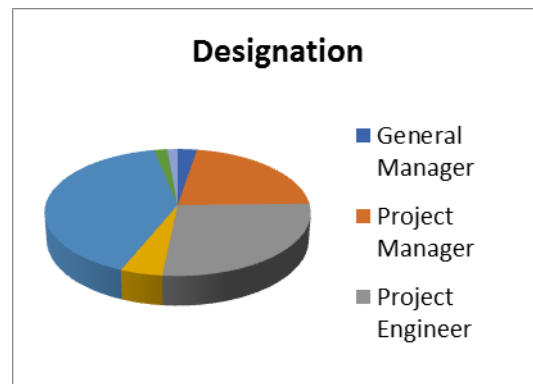


Figure 2 Designation

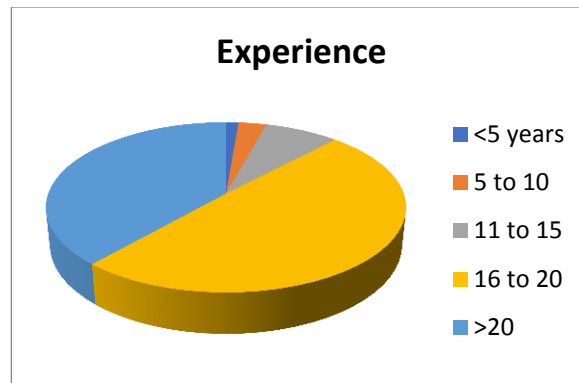


Figure 3 Experien

RESULT & CONCLUSION

Construction industry is considered to be one of the most risky business sectors. Since construction process involves a large number of activities the chance for the occurrence of risks are very high in construction industry. Risk may results in serious financial loss, disputes, delays, and even in the stoppage of work. Totally for 50 companies the questionnaires were given, out of which 36 had an effective reply. All the questionnaire survey was done from project manager, project engineer, site engineer of the project at the construction site. In some cases, consultant gave the answers on behalf of their clients. Risk is described as a negative term, even though in theory it can have two dimensions.

- Professionals in the construction industry are using techniques described in the literature

concerning RM, but are not aware of it.

- There is a willingness among respondents to start using RMP, but it has to bring profits to the organization.
- By applying a simple method, it is possible to identify potential risks in an easy way. Moreover it gives possibility to detect which of the identified risks has the biggest impact on time, cost and quality. Those risks should be eliminated or mitigated by taking an appropriate action. The research showed that the most common action was risk mitigation. Moreover it was proven that the results from probability and impact method may differ among project due to the fact that each project and its scope area unique.

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