# Investigation on risk analysis in construction industry using SPSS.

**[1]Muhammed Shafeeq cp, [2]Thirugnanasambantham N**

[1]M Tech Student, [2]Assistant Professor
Department of civil Engineering,
Sree Venkateshwara Hi-Tech Engineering College, Gobi, Erode, Tamil Nadu, India.

*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 proje ct 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.**

## I. INTRODUCTION

The construction industry is considered as one of the most complex industrial sectors. 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 come 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.

## II. 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 than 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.

## III. METHODOLODY

Through literature study, the 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 sample amount of experience. After that, the data were analyzed with Statistic Package for Social Studies (SPSS) software.
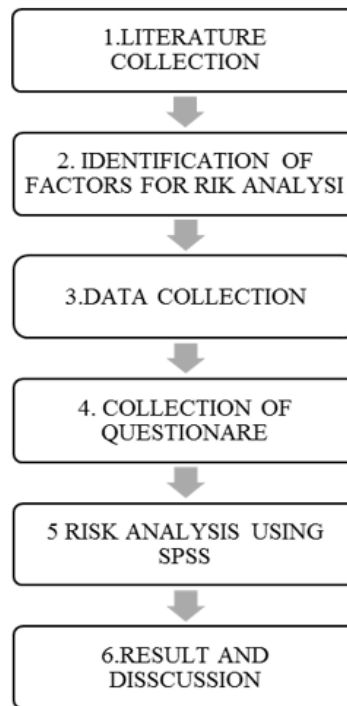
**Figure 1 Step by step process of methodology**

## IV. DATA COLLECTION

The questionnaire survey was collected from the various construction projects by mail or by personnel meeting. The questionnaires were 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.

## V. 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 |

## VI. FREQUENCY ANALYSIS

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

**Table 2 Designation**

| | Frequency | Percent | Valid Percent | Cumulative 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**

**Experience**

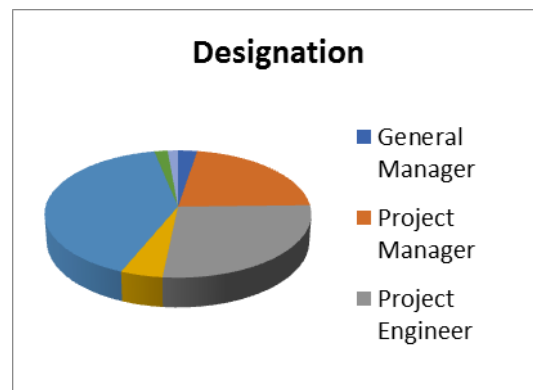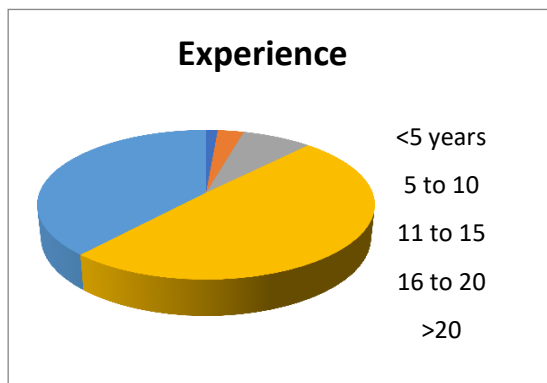| | Frequency | Percent | Valid Percent | Cumulativ e Percent |
|---|---|---|---|---|
| <5years | 1 | 1.3 | 1.3 | 1.3 |
| 5-10 | 3 | 3.9 | 3.9 | 5.2 |
| 11-15 | 6 | 7.7 | 7.7 | 12.9 |
| 16-20 | 10 | 49.0 | 49.0 | 61.9 |
| >20 | 16 | 38.1 | 38.1 | 100.0 |
| Total | 36 | 100.0 | 100.0 | |

**Figure 2 Designation**



**Figure 3 Experience**

## VII. RESULT & CONCLUSION

The 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 areusing techniques described in the literature concerning RM,but are not aware of it.

☐     There is a willingness among respondents tostart using RMP, but it has to bring profits to theorganization.

☐     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 appropriateaction. The research showed that the most common action was risk mitigation. Moreover itwas 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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