

# Risk Management using Primavera Software for Residential Sector

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**Abstract** - Risk management constitutes identification, assessment and setting preference for risk mitigation. This may include a synchronized and cost effective way of using the materials and resources in an order to minimize the hazards that may arise along with monitoring and controlling the unfortunate events that may occur. Risk can happen due to uncertainty in financial market, accidents, failures in the project, natural factors, legal issues, risk associated with credit etc. Different methods can be applied to manage risk which may range from transferring of the risk to subsequent party, avoiding the risk factor, minimizing the consequences of risk and accepting the effect of risk in few cases. Project requires a special mission which is used by the client to get a viable edge in the market to operate. The past projects do not match the subsequent project due to its uniqueness which ultimately increases the chances of hazards. The characteristics of each project keeps on changing which make it difficult to be imitated. This requires unique skills to manage and accomplish the process.

**Key Words:** Risk management, Risk identification, Risk mitigation, Residential sector, Primavera.

## 1. INTRODUCTION

Risk Management is becoming more and more important in the field of civil engineering. One of the main reasons is that more and more projects fail, generating high unplanned costs. Risks can be so expensive that they even can lead to the downfall of a company. To increase the probability of success it is necessary for an organization to understand the potential risks that are involved in all these resources. Risk management is a fundamental component of project management. The Project Management Institute (PMI) lists the management of risk in their Project Management Body of Knowledge as one of nine knowledge areas for project management, along with the management of project scope, cost, and schedule.

Every new product innovation has to deal with risks and with every decision, there are risks associated with it. When starting a new land development project there cannot be a complete understanding of all the components, the technology, people's knowledge and expertise. So risks will be taken and decisions have to be made on how to handle those. To get an understanding of the potential risks they have to be systematically measured, the effects and possible causes of them have to be anticipated and then appropriate methods have to be chosen to deal with them. Once the risks

have been identified they can be reduced, removed, avoided or accepted.

## 2.1 Agnieszka Dziadosz and Mariusz Rejment, 2015

The risk is a measurable part of uncertainty, for which authors are able to estimate the occurrence probability and the size of damage. The risk is assumed as a deviation from the desired level. It can be positive or, which most often happens, it can be negative. Therefore, the risks analysis is so important for project selection and coordination of construction work. The risk analysis is regarded as the analysis of adverse events even at the stage of planning and programming of a construction project. In analysis authors enrich the decision-making process and provide additional arguments, which help to select the optimal variant of a construction project using the Multi-Aspects approach. In article authors present three different methods of the risk analysis as well as highlighting their disadvantages, advantages and primary areas of application (selection or pre-estimation). The analysis was finished on the statistical method, which determines the type of used data therefore it affects the quality of the results. [1]

## 2.2 Mr. Satish K. Kamane and Mr. Sandip A. Mahadik, 2015

Construction projects are characterized as very complex projects, where uncertainty comes from various sources. Construction projects gather together hundreds of stakeholders, which makes it difficult to study a network as a whole. But at the same time, these projects offer an ideal environment for network and risk management research. Additionally, construction projects are frequently used in management research, and several different tools and techniques have already been developed and especially for project. However, there is a gap between risk management techniques and their practical application by construction contractor. In this research authors have given identification of risk by different methods, types of risks associated with construction project and different risk mitigation techniques. In the construction industry, risk is often referred to as the presence of potential or actual threats or opportunities that influence the objectives of a project during construction, commissioning, or at time of use. Risk is also defined as the exposure to the chance of occurrences of events adversely or favourably affecting project objectives as a consequence of uncertainty. It may be stated that risk Management is the core of project management. [2]

### 2.3 Shankar Neeraj, Balasubramanian, 2015

The risk is a choice in an environment rather than a fate. The risk is present in all the activities in a project; it is only the amount which varies from one activity to another. Evaluating and analysing the risks of a project and planning to manage them are the most critical steps should be done in the project definition stage. Risk evaluation and analysis were ignored. The track record of the construction industry is very poor in terms of coping with risks, resulting in the failure of many projects to meet time schedules, targets of budget and sometimes even the scope of work. As a result, a lot of suffering is inflicted on the clients and contractors of such projects and also to the general public. The general methodology of this study relies largely on the survey questionnaire which was collected from the local building contractors of different sizes by mail or by personnel meeting. A thorough literature review is initially conducted to identify the risk factors that affect the performance of construction industry as a whole. The survey questionnaire is designed to probe the cross-sectional behavioural pattern of the construction risks construction industry.[3]

### 2.4 O. O. Odumabo, C. F. Oduoza, 2013

Economic growth and socio-economic development are particularly important for developing countries, and the construction industry plays a central role in driving both of these. The general situation observed currently in building construction in developing country such as Nigeria is that the output of a construction company is usually characterized by poor-quality work, cost and time overruns. These characteristics originate because a number of risk factors have not been properly taken into consideration in the project planning and implementation stage. Therefore, a focus on risk management is necessary to improve the current project's poor performance. In this study, the Delphi method for construction building project risk and the Bayesian belief network is adapted to model risk assessment/management in building construction environments. By analysing data a Framework for Risk Assessment of Building Projects in Construction Firms is prepared. [4]

### 3. GAP IDENTIFICATION

In construction sector, risk is very important part but in many projects it is not taking very seriously. Due to lack of awareness of loss of project, risks are not considered an important part. Because of that there is loss of money, wastage of time, project can't complete in schedule. If risks are identified by various methods and effect is calculated in software then we come to know the severity of risk. So we can manage project in different ways. We can use different options to reduce effects of risks on project. By using software it becomes easy to work on risk part and it affects on project schedule and budget also. By understanding scores we can apply strategies to reduce the risks. So, we can easily

measure reduced scores and risk mitigation strategy becomes very easy.

The questions that are addressed by this research are:

1. What are the best international practices currently applied in risk management on construction projects and how they compare with the current practices?
2. How can risk management practices in organizations and companies involved in construction projects be assessed?
3. What knowledge is needed for an effective and efficient management of risk in construction projects?
4. How can needed risk management knowledge be obtained, organized and made available in a systematic and useful way?

### 4. METHODOLOGY

In this project work, prepared questions for survey by identifying factors which require in primavera for matrix formation. By studying some research papers on risk management in construction industry, residential building from Pune is choose for case study. Total 10 people are respondent for this survey and 28 general risks are considered. Ranking is done on the basis of 5 options viz. (Very high, High, Medium, Low, Very low).

#### Procedure of work:

Step 1: Rank the probability, schedule and cost as per very high to very low.

Step 2: Analysis of response and calculate probability score.

Step 3: Risk categorization

Step 4: Risk result wise factor count.

In this analysis probability is taken as per filled in survey report and impact is taken from cost. From probability and impact calculation probability score is identified. By using probability score average of each risk category is taken. After taking average risk categories are ranked as per high, medium and low.

### 5. RESULTS AND DISCUSSION

In questionnaire survey risks are ranked as per their occurrence and their impact as per probability, cost and schedule.

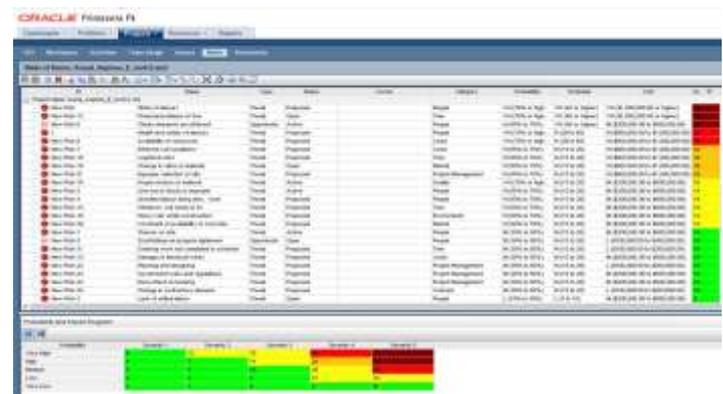
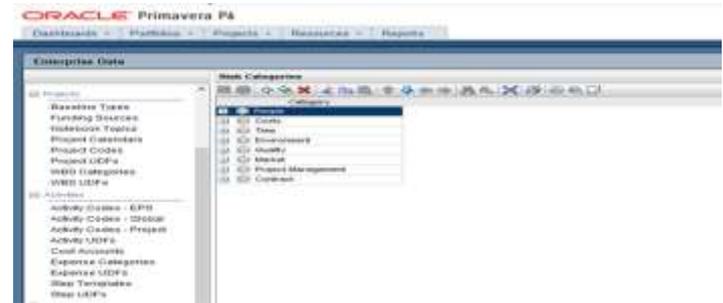
**Table 5.1: RESPONDENT SHEET OF HIGH RISE BUILDING (Average taken from survey)**

Risk Factors	Type (Threats or Opportunity)	Probability	Cost	Schedule
<b>1) Time</b>				
Logistical risk	T	H	H	L
Centring work not completed in time	T	M	L	M
Financial problems of firm	T	VH	VH	VH
Windows are not ready to fix	T	H	M	M
<b>2) Quality</b>				
Not proper supervision	T	L	L	L
Proper mixture of material	T	VH	M	M
<b>3) Project Management</b>				
Improper selection of site	T	H	H	H
Planning and designing	T	M	L	M
Government rules and regulations	T	M	M	M
Rera effect on booking	O	M	M	H
<b>4) Contract</b>				
Change in contractors demand	T	M	L	M
Not using selected material	T	L	L	L
<b>5) People</b>				
Health and safety of labours	O	H	VL	H
Strike of labours	T	VH	VH	VH
Thieves on site	T	M	M	M
Lack of skilled labour	T	L	M	L
Line out of blocks is improper	T	M	M	M
Unskilled labours doing electrical work	T	M	M	M
Scaffolding not properly tightened	T	M	L	M
Clients demands are different	T	VH	M	VH
<b>6) Market</b>				
Change in rates of material	O	VH	H	VH
Constraint of availability of concrete	T	M	M	M
<b>7) Environment</b>				
Water percolation while excavation	T	L	VL	L
Heavy rain while construction	T	M	M	M
<b>8) Cost</b>				
Different soil conditions	T	M	H	M
Availability of resources	T	H	H	H
Damage of blocks	T	L	L	L
Damage of electrical wires	T	M	M	M

**Table 5.2: Risk categories and their ranks**

Risk Category	Result
Time	H
Quality	L
Project Management	M
Contract	L
People	H
Market	H
Environment	L
Cost	H

As per these results and discussions risks are identified as per high to low



**6. RESULT AND DISCUSSIONS**

**General recommendations to manage risks for high rise building construction**

- 1- Clients should study the internal and external risk factors related to that building project with help of advanced managerial and financial institute to reduce such arise.
- 2- Due to high competition in market the client not giving the importance to the design phase of project which is very important in construction process. They have to concentrate more on design phase.
- 3- Firm has to acquire how to split and shift the different risks in different way by hiring specialized sub-contractors.
- 4- Contracting firm has to prevent the financial failures by adopting the strict cash flow management and less depend upon banking sectors.
- 5- Firm has to study and apply computerized viewpoints used for risk analysis and evaluation of risk by using Microsoft Excel or any other software's.
- 6- Mostly if possible risk manager should be there and risks should be identified while planning the project.

## 7. CONCLUSIONS

1. An effective risk management process encourages the construction company to identify and quantify risks and to consider risk containment and risk reduction policies. Construction companies that manage risk effectively and efficiently enjoy financial savings and greater productivity improved success rates of new projects and better decision making. Risk management in the construction project management context is a comprehensive and systematic way of identifying, analyzing and responding to risks to achieve the project objectives.

2. The construction companies need to include risk as an integral part of their project management. Decision making such as risk assessment in construction projects is very important in the construction management. The identification and assessment of project risks are the critical procedures for projecting success. This case study determines the key factors of risk in construction industry of building

3. This research is unique in a way that a project case study is used to develop a better understanding using the realistic data compared with formulated model of risks.

4. A stepwise case study is elaborated in the light of the guidelines. From the results of the case study of building construction at Pune, it showed that the forecasted results are approximately accurate as per their experience.

5. In case study, high risk categories are time, people, market, cost which are highlighted in red Color. Medium risk is identified project management and low risks are identified as quality, contract and environment.

6. Out of eight main categories four categories are under high risk, one is under medium risk and three are under low risk.

7. Future scope of the project is wide as same model can be applied in similar constructions to avoid risks. The model can be easily modified and applied in any construction risk involving attributes to analyze the most critical attributes causing risks to the construction of building.

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