

Risk Management of Construction Projects by using Primavera Risk Analysis

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Abstract - In Indian construction industries like residential, commercial, educational, etc risk is the main factor that can affect the period of construction of any work and main cause for delay of construction work. In Primavera risk analysis software (PRA) risk are analyzed like financial risk, environmental risk, material risk, labour risk, political risk, etc. Scheduling is done properly by risk management to obtaining the required time for construction project and probability of start and finish date of construction project by Primavera Risk Analysis software.

Key Words: Risk management, project management, Primavera software, Analysis.

1. INTRODUCTION

The risk are analysed by risk management software process by using Primavera risk analysis. The risk management process firstly starts with the identification of risks followed by their analysis, response and monitoring. Risk is defined as an uncertainty of outcome, whether positive opportunity or negative threat, of actions and events. The risk has to be assessed in respect of the combination of the likelihood of something happening, and the impact which arises if it does actually happen. Non availability of labours, funds and weather conditions are the common risks. And the political, environmental, etc. are the types of risks. We calculate the period of construction by this risk analysis process by using Primavera risk analysis software and give 90% assurance about duration of construction project.

1.1 FUTURE SCOPE

The schedule can also be loaded with cost parameters in the PRA, which can be useful for economic or financial analysis of project. In this current study only the time factor was considered for the analysis. The same study can be performed with cost parameters.

1.2 LIMITATION OF STUDY

The result obtained by this study are in terms of probability. So, the limitation is it does not give 100% guarantee about the expected results i.e; it is probabilistic approach.

2. LITERATURE REVIEW

Mohamed A Aderbag and Mohamad A Sherif (2018) stated that in order to carry the process perfectly, an efficient program tool was used called the PERT-Master Primavera risk analysis tool. By using information gathering techniques a total number of forty four risk events related to different risk categories were identified by the end of risk identification process.

Danish Ali and Alvin Harison (2016) stated that the risk management concept is essential in reducing losses. They also include safety management and occupational risks are important parts of construction. Construction risks are playing important role for construction contractor.

Mohammed Zaki Haider, Rajendra.S and Vijay.K. (2016) identified that the Oracle Primavera P6 web logic is highly advanced compared to Primavera standard Oracle Primavera alone P6 in terms of planning, scheduling, and tracking for any company project.

Divya Gupta, Manoj Sharma and Dr. Ashutosh Shankar Trivedi (2015) suggested that 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.

Divyang Solanki J.D. Raol (2015) found that using this software we conclude that whatever work is going on if it is collected in particular format we can easily identify the problem among that and find alternatives.

X. Regina Mary and V. Rathinakumar (2015) stated that the schedule made by using techniques that reduce the constraints helps for the project to complete earlier of five to seven months from the actual base schedule of the project and thereby increase the profit outcome from the project.

Joseph Ignatius Teye Buertey (2014) concluded that the major risk factors affect the cost of construction. They said that level of knowledge and the application of risk in work is limited. Since this research paper is not challenges in estimation of cost of the construction project.

Dr. Haitham H. Al-Shibly, Dr. Basem M. Louzi and Mohammad A. Hiassat (2013) identified that to manage risk effectively and efficiently, the contractor must understand risk responsibilities, risk event conditions, risk preference, and risk management capabilities.

Satish K. Kamane and Sandip A. Mahadik (2013) found that it may be stated that risk management is the core of project management. The success of every project depends on how efficiently and effectively the risk avoidance may include a review of the overall project objectives leading to a reappraisal of the project as a whole.

Pethe S. And Adavi P., (2013), suggested that project management concepts are no longer theoretical but have got converted to technology driven means. There are some more parameters of Primavera such as Primavera architecture, calendars, scheduling, work breakdown structure, resource assigning, its analysis and leveling, updating, etc. But here we have discussed the major parameters which affect the construction industry in a far bigger way.

Belu Nadia, Anghel Daniel Constantin and Iliesorin (2010) concluded that Primavera software products management needs of organizations that manage large numbers of projects at one time. These integrated applications use project management to support the management needs of project teams in different locations and at varying levels of the organization.

Ehsan N. and Alam M., (2010), suggested that formal risk analysis and management techniques are rarely employed by Pakistani construction industry owing to the lack of experience and knowledge in the area. The industry also holds disbelief that these techniques are suitable to be employed in construction projects, much in the same manner as employed in other industries.

3.OBJECTIVES

- 1.To prepare construction schedule for selected plan.
- 2.To assign uncertainty in the schedule prepared.
- 3.To perform simulation in order to get expected duration of the project.
- 4.To compare the result obtained in simulation with PERT calculations.
5. To conclude on period of completion of construction of project with the help of PRA.

4.METHODOLOGY

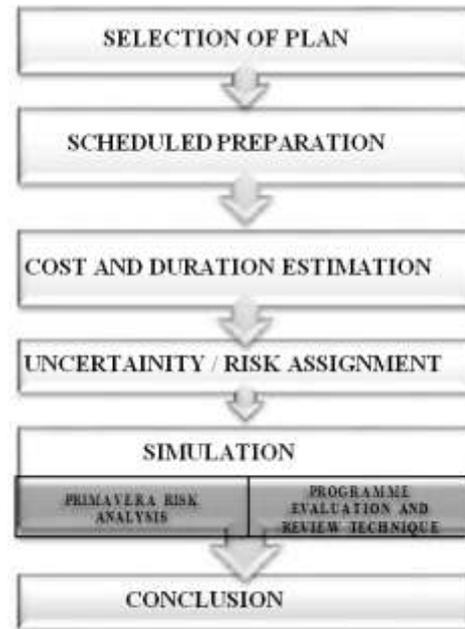


Fig.1: Flowchart

4.1 Selection of Plan

Identify Risks is the process of determining which risks may affect the project and documenting their characteristics. Identify risks is an iterative process, because new risks may evolve or become known as the project progresses through its life cycle.

4.2 Scheduled Preparation

Actual schedule preparation process starts with the collection of data like project start date, activities involved in the construction of any structural activities sequences, duration taken for each and every activities, resources needed for each and every activities and its amount, cost spent for each and every activities. The collected data are entered in the software and the relations between the activities are given as per its sequence of activities collected.

4.3 Duration Estimation

Quantitative risk analysis is the process of numerically analyzing the effect of identified risks on overall project objectives using modeling and simulation. By analyzing the risk and scheduling we calculate the cost of the execution work and expected period for the construction work of the project.

4.4 Uncertainty / Risk Assignment

The effective development of infrastructure through construction is an issue of growing concern satisfaction and study. One of the challenges to optimum construction is risk

and uncertainty that project face, due to evaluating and immersing condition through the project lifecycles, organization and environment. By analyzing the risk and uncertainties we evaluate the effects on cost and duration of construction work.

4.5 Simulation

Simulations are typically performed using the PERT and PRA technique in a simulation, the project model is computed many times (iterated), with the input values (e.g., cost estimates or activity durations) chosen at random for each iteration from the probability distributions of these variables. A histogram (e.g., total cost or completion date) is calculated from the iterations.

5. RESULTS

After risk analysis in Primavera Software we obtained three graphs as per follows:

5.1 Finish Date Graph: There is 35% probability to complete construction project work in 55 days on 25/06/2019. 50% probability to complete construction project work in 57 days on 27/06/2019 and 80% probability to complete construction project work in 59 days on 29/06/2019. Therefore minimum possibility of completion of work is on the date of 16/06/2019 and maximum possibility of completion of work is on the date of 09/07/2019

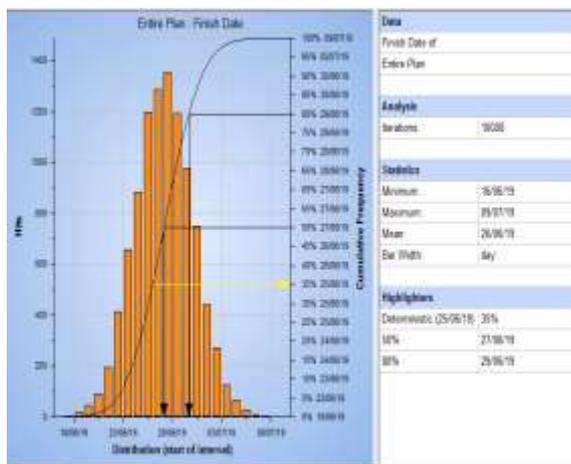


Fig. 5.1 Finish Date Graph

5.2 Start Date Graph: To develop schedule risk model, we used primavera risk analysis tool throughout importing the original schedule, the project starting in 02/05/2019 and it is scheduled to be completed in 25/06/2019 (55working days). There is 100% probability for Starting The work On 02/05/2019 date.

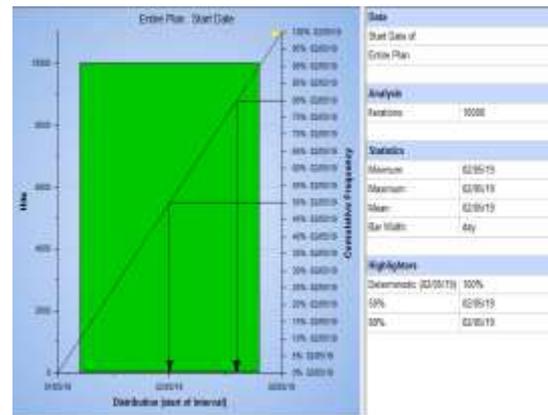


Fig 5.2 Start Date Graph

4.3 Duration Graph

There is 35% probability to complete construction project work in 55 days on 25/06/2019, 50% probability to complete construction project work in 57 days on 27/06/2019 and 80% probability to complete construction project work in 59 days on 29/06/2019. Therefore minimum 46 days required for complete construction project work and maximum 69 days required for complete construction project work

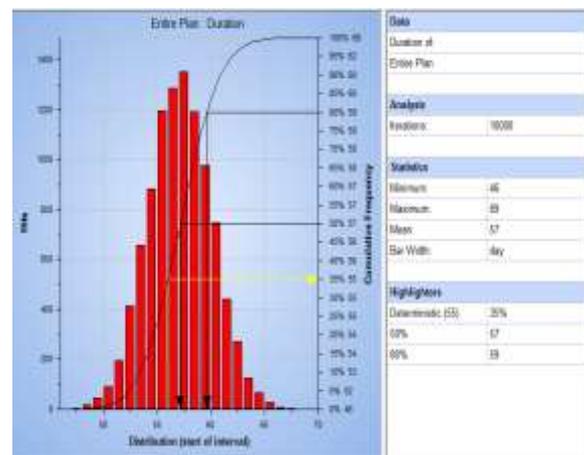


Fig 5.3 Duration Graph

6. CONCLUSIONS

- 1.You can predict the time required for any construction project by using Primavera Risk Analysis.
- 2.By referring to results of Primavera Risk Analysis, we can assign the alternative activities. This will help in covering the delay caused in the overall project.
- 3.The iterations is limited to 10000 only. This is not suitable for large scale project in order to get accuracy in Risk Analysis.

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