

Review on Optimum Scheduling and Planning of Frame Work

Vaijanath M. Basangi, Uday Phatak

M. E Student, Department of Civil Engineering (Construction Management), Padmabhooshan Vasantdada Patil Institute of Technology, Pune, India

Professor, Department of Civil Engineering (Construction Management), Padmabhooshan Vasantdada Patil Institute of Technology, Pune, India

ABSTRACT: Construction projects are one-off attempt with many unique features such as long duration, complicated processes used for it, abominable environment in which project has to be completed, financial intensity of the project and dynamic organization structures and such organizational and technological complexity generate various risks. If it is observed schedules are essential to the successful execution of projects. However, schedule often contain significant uncertainty because risk and uncertainty are ingrained in all construction activities. It is widely accepted that construction project schedule plays major role in project management due to its influence on success of project. The uncertainty and reliability related issues are becoming more critical in engineering design and analysis, proper assessment of the probabilistic behaviour of an engineering system is important in this global competition with the limited resources time and cost in project management is paid increasing attention for any project, schedule is essential to the successful execution of the project, so the management of schedule is very critical, it is observed that important risk about the construction schedule is duration risk duration of the risk means the possibility and loss of incompleteness in the stipulated duration limit. so it require to analysis the probability of each work in PERT analysis beta distribution it simulates the project duration and analysis the risk of construction schedule by simulation method the overall project to accurately determine probability of the project under considering of the changeability and randomness of duration of each activity. Economic order quantity (eoq) of each item produced to find the supplies they show independent state. Utilization of this model will help the association to determine the optimal number of items of the order within one year and when to put the new request for each item

With the onset of High Rise Buildings in metropolitan cities, planning and scheduling has become a major concept to be considered for a smooth execution of construction works. Oracle's Primavera P6 is an effective tool for determining an ideal schedule for construction activities. This project serves as a perfect reference frame for scheduling different High Rise Buildings. All the important steps like creating an EPS, creating a WBS, linking of activities according to their interdependence and availability of resources, reduction of float values, and determination of Critical Path are clearly exhibited in this report.

KEYWORDS: Planning, Scheduling, High Rise Buildings, Primavera, Critical Path, Gantt Charts.

I. INTRODUCTION

Tall buildings throughout the world are becoming popular day by day. With the advent of modern day construction technology and computers, the basic aim has been to construct safer buildings keeping in view the overall economics of the project. A high-rise building, apartment tower, office tower, apartment block, or block of flats, is a tall building or structure used as a residential and or office use. Indian Standards defines a high-rise as "A multi-story structure between 35–100 meters tall, or a building of unknown height from 12–39 floors." According to the building code of Hyderabad, India, a high-rise building is one with four floors or more or one 15 meters or more in height. In some areas they may be referred to as "Multi Dwelling Unit" or "Vertical cities". They have the potential to decongest the urban sprawl on the ground level, and increase the urban density, housing higher number of families in lesser space.

In India, a building greater than 75ft (23 m), generally 7 to 10 stories, is considered as high-rise. Also a building is considered to be high-rise when it extends higher than the maximum reach available to fire fighters. According to the building code of India, a tall building is one with four floor or more or a high rise building is one 15 meters or more in height. The Mumbai Municipal Corporation (BMC) proposed that any building with a height of 30m (nine floors) be categorized as a high rise. This is an increase of 6m from the existing definition (24m or seven floors). Due to an increasingly competitive environment, construction companies are forced to be more efficient and achieve

competitive operational advantage. Companies are always looking for improvements in equipment features, communication tools, efficient management techniques, and training human resources. Construction companies are also narrowing their focus, becoming specialists in certain types of construction projects. This specialization requires more focused project planning and controlling techniques that prove to be better for certain type of projects while providing specialized construction services. The benefits of effective planning, scheduling and control of construction projects are: reduced construction time, reduced cost overruns. Planning is the process of identifying all the activities necessary to successfully complete the project.

Scheduling is the process of determining the sequential order of the planned activities, assigning realistic durations to each activity and determining the start and finish dates of each activity.

The process of converting a general or outline plan for a project into a time-based graphics presentation given information on available resource and time constraints.

Construction Planning is the necessary forerunner to scheduling and it includes:

- Defining work tasks
- Determining general sequence
- Defining construction methods
- Assigning responsibility

II. PROBLEM STATEMENT

To understand the scheduling and planning of a High Rise buildings and schedule the list of the planned activities using computer applications.

Indian cities are witnessing immense demographic expansion due to migration from surrounding villages, leading to urban sprawl, housing demand, rise in cost of land. Many citizens all over India migrate to the cities for better jobs and education. Industries, trade and commerce activities and number of educational centres in cities attract floating population from all their surrounding villages and districts. This has expanded the cities in all directions and all aspects of development. With an urban sprawl of kilometres, these face the problems of congestion, pollution, everyday commuting to work place, competition, deforestation etc. Thus there is a necessity that for a young nation like India, its Civil Engineers must be well equipped with the knowledge of high rise buildings, since their proficiency in such structures is directly reflected on the overall infrastructure of the country.

III. SCOPE OF PROJECT

- Given Pune population density, going vertical is the mantra these days as developers argue that high rises are the sole answer to the city's housing problem.
- Old, dilapidated structures are being pulled down to make way for skyscrapers, mall and glossy office buildings as high rises are seen as the answer to the unplanned, low-rise, hyper dense slum settlements which house at least 60 percent of the city's residents.
- The emergence of these residential skyscrapers is not an unexpected trend. According to experts, as cities gear up to cope with the increasing population, the tall building may well become the new normal, not by choice, but by default. "No large city, which has a growing population to accommodate, can afford not to go tall,"

IV. OBJECTIVE

- To find the probability of project completion date as per the schedule using optimum scheduling planning and frame work.
- To find probability of project completion date as per the schedule
- Define the method of implementation of probability analysis using the suitable technique
- To estimate the scheduled date of project completion (of case study) as per the advice from experience site team and planning team on any of the project scheduling software.

V. LITERATURE REVIEW

Paper 1

Abramovitz and Modigliani et al. (1957) they highlighted the connection between capability utilization as well as inventory investment. Existing inventory of inventories was likely to change to the desired quantities. Hence the adjustable, existing inventory of inventories, was necessary to be badly associated with the preferred inventory. The end result was that there's good relation of all the ratio of inventory to product sales as well as inventory investment. High ratio of stocks to product sales in the past indicates necessity of higher amounts of inventories before and promising excessive buy of inventories in the present time too. (1)

Paper 2

Krishna Murthy et al. (1964) Study was aggregative and also managed inventories of the private sector of Indian economic climate like an entire for the period 1948 61. This particular analysis used product sales to represent need for the item and also suggested the benefits of accelerator. Short term rate of interest had been discovered to be considerable. (2)

Paper 3

R.S. Chadda et al. (1964) Study was created on inventory management methods of Indian businesses. The analysis recommended program of contemporary scientific inventory management methods as activities research. These contemporary medical methods furnish possibilities for all the businesses, Companies are able to reduce the investment of theirs in inventory but there's constant flow of output. He argued that industrially advanced nations, USA, like, were interested in building extremely advanced mathematical versions as well as methods for modernizing as well as redefining the present resources of inventory investment. (3)

Paper 4

National Council of Applied Economic Research (NCAER) et al. (1966) Conducted a report in 1966 about working capital management of 3 industries specifically cement, sugar and fertilizer. This particular analysis mostly dedicated to ratio analysis of structure, financing and utilization of working capital for the time of 1959 to 1963. The study reveals that inventory constituted a significant component of working capital i.e. 74.06 per dollar in the high sugar industry followed by cement market (63.1 %) as well as fertilizer market (59.58 %). It was noticed that listing had not handled properly. Up to now as the utilization of working capital was fertilizer, cement, and concerned business had better implementation of working capital. The sugar business had substantial build-up of stocks so we had ineffective utilization of working capital greatly. (4)

Paper 5

Krishnamurthy and Sastry et al. (1970) It's probably the most thorough research on manufacturers' inventories. They utilized the CMI information and also the consolidated balance sheet information of public restricted businesses posted by the RBI, to analyse every one of the main elements, such as the raw materials, finished and goods-in-process foods, for twenty one industries with the time ranging from 1946 62. The study was a period sequence 1 although there was several inter industry cross section analyses that have been carried through in the evaluation. The Accelerator represented by change of product sales, short-term interest and bank finance rate was discovered to become a crucial determinant. The utilisation of prosperous capability as well as cost anticipations had also been discovered to be applicable in the research. (5)

Paper 6

George et al. (1972) It was the analysis on cross section analysis of balance sheet information of fifty two public restricted businesses because of the time of 1967 seventy. Accelerator, external and internal finance variables have been viewed in the formulation of formulas for raw materials such as goods-in-process inventories. Nevertheless, formulas for done products inventories conceive just output adjustable. Deliberation was provided on external finance variables and accelerator. (6)

Paper 7

Mishra et al. (1975) It's the analysis of 6 main public sphere enterprises. He realized that (i) inventory constitutes the most crucial element of working capital of public enterprises (ii) performance of working capital money used within receivables is awfully lower in the selected companies and also (iii) In most devices both today's assets as well as the fast ratios are higher compared to the standards of theirs. Enterprises require appropriate command on receivables. (7)

Paper 8

Lambrix and Singhvi et al. (1979) Adopted working capital cycle procedure in working capital management, additionally recommended that investment in working capital could be enhanced and money flows could be raised by decreasing time frame of bodily flow beginning from the receipt of raw material to the shipment of finished products, i.e. inventory management, and also by enhancing the conditions as well as conditions where firm offers items in addition to receipt of money. (8)

Paper 9

Lal et al. (1981) He learned Modi Steels Limited as a case study, his analysis concentrated on inventory control. He originated an unit which will include price varying in inventory management; previous cost variable in catalogue wasn't considered in that organization. The evaluation suggested stable policies that will take care of external and internal factors, ultimately it'd aid in earning effective working capital control. (9)

Paper 10

Farzaneh et al. (1997) presented a mathematical model, to help the businesses in the decision of theirs to change from EOQ to JIT purchasing policy. He defines JIT as "to produce and provide done foods only soon enough being available, sub-assemblies only in time to be assembled in products & bought substance only in time to be converted into fabricated parts". He highlights the EOQ design concentrates on reducing the inventory fees instead of reducing the inventory. Under the perfect problem wherein all of the circumstances satisfy, it's economically better off to select the JIT with the EOQ since it leads to purchase price, buying price. (10)

Paper 11

Rich Lavelly et al. (1998) Asserts that inventory means "Piles of Money" on the profit and the shelf for the tight. Nevertheless, he notices that thirty % of the listing of nearly all retail stores is old. Thus, he argues the catalogue management is facilitate the dealer activities by decreasing rack time and therefore boosts profit. Also, he elaborates the 2 kinds of inventory calculations which figure out the inventory amount necessary for earnings. The 2 calculations are "cost to order" as well as "cost to keep". Lastly, he proposes 7 steps to inventory management. (11)

Paper 12

Dave Piasecki et al. (2001) He centred on listing type for calculating the perfect order quantity which utilized the Economic Order Quantity technique. He highlights that lots of businesses aren't utilizing EOQ type due to bad results resulted from incorrect details input. He claims EOQ is an accounting formulation which establishes the point at what the mixture of order costs as well as listing expenses would be the very least. He highlights that EOQ strategy wouldn't clash with the JIT method. He further elaborates the EOQ method which contains the parameters such as for instance annual use for device, carrying cost and order cost. Lastly, he proposes many measures to go by in employing the EOQ design. The limitation of this particular literature is it doesn't elaborate relationship that is further between JIT. and EOQ It doesn't connect the listing turns with the EOQ formula and additionally fails to point out the benefit gain with all the amount is estimated. (12)

VI. CONCLUSION

Primavera serves as an effective tool for generating Gantt chart for the schedule of a High Rise construction. With the help of Primavera a scheduler can:

- » Effectively link all the activities involved in the construction of the project.
 - » Determine the total duration required for the construction of the different phases involved.
 - » Determine the Critical Path of the schedule of the project.
 - » Determine the total float generated due to interdependence of activities.
 - » Keep a track of the scheduled and the on-site construction.
 - » Assign the resources in a manner that expenses and time duration and shortened and the project proves economical.
- From the site investigation by applying EOQ in SP CONSTRUCTION PUNE following conclusion are drawn EOQ analysis is kind of method, which provides the means for classifying those items that make the largest effect on a company's overall inventory cost performance
 - EOQ classification to identify and define the safety stocks, which is a protection so that does not lack of material as well as stocks average, maximum and minimum, so as to assess the amount necessary to avoid a lack of raw material and without any accumulation in inventory.

- Total investment cost of the material which widely used in SP CONSTRUCTION in Case study 1 without use of EOQ is Rs. 7381170 & with use of EOQ is Rs. 2285250 also with using of EOQ cost saving in material is 70 %.
- The primavera software by adopting proper material management system large amount of cost can be reduced in large projects and that saved cost can be used in some small project as our country already running short money.
- In the material management the main important factors are planning, assessing the requirement, sourcing, purchasing, transporting, storing, and controlling of materials, minimizing the wastage and optimizing the profitability by reducing cost of material.
- Failure in managing site inventory will result in cost overrun, delays in project completion and reduce overall project performance.
- In the material management also observe the major factors of poor control are Improper management of time, cost and manpower.
- Primavera software is the major part of their 25% cost of total production there is a need for inventory control by way of reducing cost and optimum utilization of materials stock is very high level.

ACKNOWLEDGMENT

We would like to express our gratitude towards guide Prof. Uday Phatak for his constant encouragement and valuable guidance during the completion of the project.

We would like to thank our Principal Dr.Chetankumar Sedani for their constant encouragement, help during the course of our studies.

We are very thankful Prof Dr. Raviraj R. Sorate Civil department for his valuable co-operation and guidance during the project work.

We take this opportunity to thank all those who are directly or indirectly involved in for their co-operation and their helpfulness during this project.

REFERENCES

1. Abramovitz & Modigliani, Franco (1957), "Business Reasons for Holding Inventories and Their Macro Economic Implications", Problems of Capital Formation, Studies in Income and Wealth, Vol. 19, NBER, pp. 495-511.
2. Krishnamurthy K., "Private Investment Behaviour in India: A Macro Time Series Study", Arthaniti, January 1964.
3. Chadda, R.S (1964), "Inventory Management in India", Allied Publishers, Bombay, 1964.
4. NCAER, Structure of Working Capital, New Delhi, 1966.
5. Krishnamurthy S. & Sastry D.U., inventories in Indian Manufacturing, Institute of Economic Growth..., Books Ltd., Mumbai, 1970; and Investment and Financing in Corporate Sector in India, Tata McHill publishing Company, New Delhi, 1975.
6. George, P. V (1972), "Inventory Behaviour and Efficacy of Credit Control", Anvesak, No.2, Vol.II, 1972, pp. 168-175.
7. Mishra (1975), "Problems of Working Capital with special reference to selected Public Sector Undertakings in India, Somiya Publications Private Limited, 1975.
8. Lambrix, R.J and Singhvi, S.S (1979), "Managing the Working Capital Cycle", Financial Executive, June 1979, pp. 32-41.
9. Lal, A.B (1981), "Inventory Models and Problems of Price Fluctuation", Shree Publishing House, New Delhi, 1981.
10. Krishnankutty, Raveesh. (2011). Panel data analysis on retail inventory productivity. The Economic Research Guardian 1(1),pp.16-23.
11. Lieberman, M.B. & Demeester, L. (1999). Inventory reduction and productivity growth: Linkages in the Japanese automotive industry. Management Science, vol.45, iss.4, pp.466-476.
12. Sanjiv Mittal, R.K. Mittal ,Gagandeep Singh, Sunil Gupta (2014)."Inventory Management in Fertiliser Industry of India: An Empirical Analysis" Asia-Pacific Journal of Management Research and Innovation ,vol.10,iss.4,pp. 291-303