



## Civil Engineering

Elixir Civil Engg. 82 (2015) 32596-32598

Elixir  
ISSN: 2229-712X

# The Use of Planning Techniques and Software in Construction Industry of India

Snehal Dewalkar, Prathmesh Mahindre, Sanket Kajale and Akash Khurpade  
Department of Civil Engineering, Sinhgad Academy of Engineering, Pune and India.

## ARTICLE INFO

### Article history:

Received: 22 March 2015;

Received in revised form:

2 May 2015;

Accepted: 15 May 2015;

### Keywords

Planning tools,  
Planning techniques,  
Residential Construction  
projects,  
India.

## ABSTRACT

Currently the residential sector in India is growing more than 26% per annum. However the efficiency of construction sector in India is very low when compared to other countries. In order to assess the current situation of planning techniques used in residential project of India, a survey is carried out in the region of Pune city. The survey indicates that there is a vast difference in the planning techniques used by construction firms depending on their sizes. The small and medium size construction firms are reluctant in using the planning tools and the focus on planning in such companies is less.

© 2015 Elixir All rights reserved.

## Introduction

According to ACREX India the residential Construction Industry is estimated at approximately \$ 35 billion, with an expected annual growth at the rate of 26% per annum till 2016. But the industry is highly fragmented with 10 top companies account for approximately 10 percent of the total revenue of the industry. The major part of the industry is attributed to unorganized real estate builders. Data from the Indian government and industry has found that on average, each construction project in India suffers from 20 to 25 percent time and cost overruns. A need to substantially strengthen production planning and construction management is emphasized in McKensey and company's (2009) report. India's 11th five year plan states- "Introduction of efficient technologies and modern management techniques to raise the productivity of the (construction) industry is vital. A national strategy and policy framework, focusing particularly on (construction) productivity enhancement and cost reduction, is required to be developed to match the envisaged work load and delivery targets." In this report, the government calls for improvements to keep up with the current rate of economic growth (7% - 8%), as well as the desperate need for infrastructure development.

In addition to advanced equipment and advanced Construction methods, Improvements in planning techniques is required to increase the productivity of the construction projects. In order to make improvements in the area of project planning, Planning techniques and project planning softwares are coming to great aid to the industry. Software's like Microsoft Project, Primavera P6 etc. are design to systematically plan the projects and can give overview of the planning along with accelerating the planning phase. Such soft wares makes the project planning more accurate, the onsite work becomes more predictable, the effects of missed deadlines in one task can be clearly assessed and future tasks can be altered etc.

In the sections that follow, we first describe the different project planning soft wares and its functions. A survey on use of different planning techniques and software used in residential

construction sector of India, followed by conclusions and discussion of lessons learned.

## Literature Review

Along with the managerial purposes, the Project management tools also serve as a tool for quality management and project planning. Due to the rapid global advancement in construction industry the presence of the Project management tools becomes even more important when considering the fact that many construction organizations in the transitional economies have no such system in place. Therefore, any use of the planning techniques and software's will probably influence the industry's performance.

Currently there are three types of planning tools available in India. The first type is limited to the scheduling techniques, e.g. MS Project. The second type is a complex project portfolio management system, such as primavera, which tries to merge all PM processes with the Enterprise Resource Planning (ERP). The last one tries to integrate PM processes with an onsite management and common practices the construction industry.

Since 1983 the PRIMAVERA SYSTEM (<http://www.oracle.com>) have been developing their PMS package for construction and today it has become a leading provider of the Project Portfolio Management (PPM) solutions for the construction industry. Primavera is suitable for project-oriented and mature companies that one can mainly find in developed countries. However, Primavera can rarely be found in the transitional economies. Furthermore, while Primavera was once mostly used to handle large and complex projects, today it is also used for many projects valued at under \$100 000.

The first version of Microsoft Project ([www.microsoft.com/project/](http://www.microsoft.com/project/)) was released for the DOS platform in 1984. The application was designed primarily as an easy-to-use tool. Since its birth, the MS Project has always been a popular tool among the project managers, but has never become the number one PM tool. This is even more evident in The construction industry, as it was never entirely aligned with the industry's special processes and procedures.

### Questionnaire survey

In order to understand the current scenario of construction planning techniques used in the construction industry of India. We surveyed the Residential construction projects in Pune. A questionnaire based survey was done with regards to use of Planning Tools and Techniques in real estate construction industry. The Questionnaire consisted of three parts containing 3 Sections. First part included the General Information. Second Part: Use of various Planning Software and Techniques in organization. Third part: Problems faced by use of these Planning Tools. We targeted members of civil engineering and construction management associations and chartered civil engineers they were approached by mails, e-mails, Telephonic and in-person.

### Data Analysis

#### Percentile distribution of Companies depending on their size:

Firstly companies were divided into 3 categories: Large, Medium and Small scale. The Small scale companies were those which had total projects worth less than 200crore INR, Companies with projects worth 201 to 500 crore were in medium scale categories and companies having projects more than 500crore were in large scale categories. From the survey it was found that, out of total companies' 89% companies use some kind of planning tool and 11% still not using any sort of planning tools.

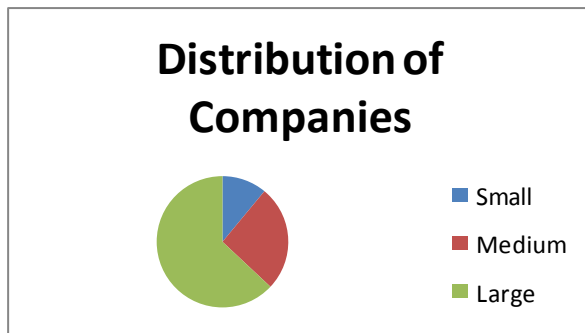


Figure 1. Distribution of companies based on their sizes.

Table 1. Percentile Distribution of Planning Engineers in Organizations.

Companies	Planning Engineers	Other Engineers
Small Scale	2.78%	97.22%
Medium Scale	3.23%	96.77%
Large Scale	4.20%	95.80%

Table 2. Percentile Distribution of various types of planning tools used by the companies.

Companies	MS Project	Primavera	MS Excel	Others	None
Small Scale	17%	0%	50%	0%	33%
Medium Scale	43%	21%	29%	14%	0%
Large Scale	36%	14%	29%	21%	0%

Note: Highlight of this chart is that almost 15% medium scales Companies still don't use proper planning tools like MS Project and Primavera and 33% of small Scale companies still not aware of planning tools.

Table 3. Percentile Distribution of various types of planning techniques used by the companies

Companies	CPM	LOB	Bar chart	PND	NIL
Small Scale Companies	0%	0%	50%	0%	50%
Medium Scale Companies	33%	0%	50%	0%	17%
Large Scale Companies	29%	0%	50%	21%	0%

Highlight of this chart is that Small scale companies work only with bar charts as planning tools.

Table 4. Percentile Breakup of Companies Using Various Methods for Deciding Labor Productivity

	Past Experience	Indian Standards	Work Study Method
Small Scale Companies	80%	20%	0%
Medium Scale Companies	60%	20%	1%
Large Scale Companies	30%	30%	4%

The last part of the survey was about the planning tools for Resource Allocation used by the companies. The highlight of this section was the small scale companies did not used any type of planning tool for resource allocation whereas on 1/8<sup>th</sup> medium scale and 1/4<sup>th</sup> large scale companies used such tools.

### Discussion

From this survey we observed that such Information Technology tools originating in the developed economies are of limited validity and applicability in the transitional economies, unless aligned with a local business conduct, still this study discovered some other findings as well:

#### Problem Faced by Using Planning Tools and Techniques

As per the questionnaire survey it was found that the most general problems faced are due to:

- Resource Leveling, Project updating and Tracking
- Difficult to co-relate with realistic situations by consider all the aspects.
- Quantifying with the scheduled and realistic data.
- Continues irregularities in co-ordination with site staff and core management.
- Wrong generation of Daily & weekly progress report leading to Mismanagement during planning phases.

#### Problem Faced by Not Using Planning Tools and Techniques:

As per the questionnaire companies faced the following problems by not using the planning tools and techniques:

- Analyzing and generating reports becomes difficult at various stages of the project
- Missing of Activities
- Tracking was impossible
- Resource Allocation
- Difficult to Reschedule subject to change in design
- Lots of Paperwork

#### Benefits of Implementation of Software over Traditional Management Tool

As per the questionnaire survey it was found that the many companies benefitted by Implementation of Software's over Traditional Management Tool, are as follows. Project monitoring day to day become feasible

- Time saving
- Monitoring & analyzing becomes easier.
- Can reproduce information & reports at any stage of the project helping forecast future possibilities.

#### Conclusion

We conclude that the Planning of the projects having repetitive nature i.e. a group of activities repeated successively for the completion of project should be done using Line of Balance Technique in accordance with any other planning technique such as CPM or PERT.

- Integration of M.S.P with B.I.M or Primavera.
- An interactive and efficient tool to constantly verify scheduling work.
- A product with a high level of extensibility and a great adequacy capacity that sets at disposal of any company all the mechanisms that allow its adjustment to any Project.
- A product with a high level of extensibility and a great adequacy capacity that sets at disposal of any company all the mechanisms that allow its adjustment to any Project.
- The new approach proved to significantly reduce the time and effort required to prepare schedules and will thus help to take the steps into daily practice.

From the above questionnaire survey study we conclude the following points:

- The percentage of planning engineers is more in the Large Scale Construction Companies compared to Small and Medium Scale companies.
- Presently in construction industry MSP is being used extensively.
- Use of Primavera is more in large scale companies as compared to medium scale companies.
- Bar Chart is still popular and widely used, rather than other advanced planning techniques.
- None of the construction companies are using LOB technique for planning.
- Small scale industry and some medium small scale industry are not using Tools for Resource Allocation
- The real estate construction companies are not using planning tools effectively e.g. for resource allocation.

#### Research Limitations

The survey was carried out in the region of Pune City of India. We have selected these points for questioner so we could compare the results and come to a generalized conclusion indicating the current situation in the construction industry of this region. Since the construction environment is so complex, our choice of planning techniques and soft wares might differ from other studies.

#### Acknowledgment

We would like to express our gratitude to Prof. R. B. Bajare Head of Civil Engineering Department, SAOE, Pune for providing all the necessary facilities and help. We also like to thank the teaching and non-teaching staff of Civil Engineering Department, SAOE, Pune for their direct or indirect help in the completion of this Research.

#### References

- [1] Chitkara K K, "Construction Project Management Planning, Scheduling and Controlling" Published by- Tata Mc-Graw Hill Publication New Delhi, Fifteenth Edition - 2008..
- [2] Mladen Vukomanović, Mladen Radujković, Zlata Dolaček Alduk, "THE USE OF PROJECT MANAGEMENT SOFTWARE IN CONSTRUCTION INDUSTRY OF SOUTHEAST EUROPE" Primjena računalnih aplikacija za upravljanje projektima u građevinskoj industriji Jugoistočne Europe.
- [3] Omar M. Elmabrouk "Scheduling Project Crashing Time using Linear Programming Technique" Proceedings of the 2012 International Conference on Industrial Engineering and Operations Management Istanbul, Turkey, July 3 – 6, 2012
- [4] M Vishal Porwal, Bhargav Dave, Jose Fernandez-Solis, Lauri J. Koskela and H. S. Mehta, "STATE OF PRODUCTION PLAN RELIABILITY–A CASE STUDY FROM INDIA" 20th Annual Conference of the International Group for Lean Construction.
- [5] Ar. A. Cindrela Devi and K. Ananthanarayanan, "Development of Resource-Driven Scheduling Model for Mass Housing Construction Projects." IACSIT International Journal of Engineering and Technology, Vol. 7, No. 5, October 2015.
- [6] T. Subramani, A. Sarkunam, J. Jayalakshmi, "Planning and Scheduling of High Rise Building Using Primavera." Int. Journal of Engineering Research and Applications www.ijera.com, June 2014.
- [7] Hill, K., Slivon, C., and Draper, J. (2007). "Another Approach to Transforming Project Delivery: Creating a Shared Mind." Proc., 15th Annual Conf. of the Int. Group for Lean Construction (IGLC-15), East Lansing, MI.
- [8] Ismail, A. Rashid, K. Hilo, W. The Use of Project Management Software in Construction Industry. Journal of Applied Sciences, 9 10(2009) 1985-1989.
- [9] Galloway, P. Survey of the construction industry relative to the use of CPM scheduling for construction projects. Journal of Construction Engineering and Management, 132 2006 p. 697.
- [10] Homoud, A. A study of planning and controlling techniques used by contractors in Iraq. Technology University, Baghdad, Iraq 1999.