



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 6.078

(Volume 6, Issue 2)

Available online at: www.ijariit.com

Planning, scheduling and allocation of resource for cost optimization of multi-storeyed structure

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ABSTRACT

In every construction project, there are two most important factors to be considered in the planning of project i.e. time and cost. Time deals with speed, quality of work and availability of tools and materials whereas cost deals with optimization and availability of resource. The aim of this project is to complete the project within a given time and a budget, and also to achieve the other objectives. The constraints that are observed in every project is time overrun and cost overrun. As we can say it's a most difficult task for a project manager to practice it, which includes fixed measuring progress, executions as per plan and corrective actions should be taken whenever required. Due to proper planning and scheduling, it gives us a knowledge of proper time and the process of cost mostly remains the same. Basically, cost optimization and allocation of resource directly deals with availability of tools and materials. With a proper sequence of activities with assigned durations and resource, scheduled is prepared. In this project critical path and critical activities are studied with the use of MS-Project 2016, so that activities should be properly observed while execution, so that there will be no delay of time in the project, and also, stay focused on the wastage of materials thus lead to the proper optimization of materials and reduction of cost.

Keywords— MS-Project, planning, Scheduling, Allocation of resource

1. INTRODUCTION

In Project Management, schedule is a listing of project's milestones and activities, usually deals with intended start date and finish dates. It involves keeping an eye and watching project work progress with respect to planned time, resources and scheduled performance during execution of the works and thus determining the activities which are require timely identification and correct action to fix it. Those items are often estimated or calculated by other information included in the project schedule of resource allocation, budget, task duration, and linkages of activities depend on each other and scheduled events. With the help of "Project Monitoring" methods its easy for collecting, recording and reporting all the information regarding the project status and performance, which are needed by the concerned project managers and other personalities who wish to know about the status of project. A schedule is most commonly used in the project planning and project management. Elements on a schedule may be closely related to the work breakdown structure (WBS), the Statement of work, or a Contract Data Requirements List given by.

1.1 Planning and scheduling of a project

Project planning is a most common and general term in construction management which helps to carry on time expected task and activities. Planning is a key to bring expected projects into an existence. Generally, the project planning involves the breakdown of a project into a various identifiable, definable and quantifiable task or activities or work and then constitutes the logical interdependencies between them. Basically, planning process refers to three important and dominant questions:

- (a) Who does it?
- (b) What is to be done?
- (c) How to carry it?

Scheduling of a project deals with the final project duration and project delivery dates. Typically, it also shows and verifies the sequential order or phasing various project activities in a systematic way to complete the project. The schedule is simple a tool or technique of a project management team which is used to predict the most probable project completion time and also enable resource conception and outflow which are required on the particular work. And thus, allocation of a resource shows who are responsible for completing who are responsible for completing each activity.

The reason for this is that a schedule itself is an estimate: each date present in the schedule is estimated, and if those dates do not have the buy-in of the people who are going to do the work, schedule will be inaccurate. In order to develop a project schedule, the following needs to be completed:

- Scope of project
- Sequence of activities
- Work breakdown
- Task dependencies map
- Critical path analysis
- Project milestones

1.2 Benefits of a well-planned Schedule

A properly executed construction schedule can help to manage materials, labours and equipments. It also allows for an adjustments to accommodate the unexpected events in the projects. This allows construction management team to complete projects on-time and on-budget.

2. OBJECTIVES

- To propose and the importance and the need of planning, scheduling in construction project works.
- To showcase an ideal schedule for (G+18) Residential apartment building.
- The objective of this study is to define best scheduling approach for a project in order to deliver project successfully in terms of time.
- To advice and suggest the procedures to contractors for scheduling of project.
- To compare the same existing structure with the running work of new building.
- To showcase the feature project tracking, gnatt chart and the uses of MS-project in the construction industry.
- To show the critical path in the case study observe in the MSP.

3. LITERATURE REVIEW

The scheduling of activities is the major requirement in project management activity. Activity scheduling is probably single most important tool for determining how project's resources should be separated. The schedule serves as a master plan from which both customer and management have an up-to-date picture of operation. Certain guidelines to be followed while preparing schedule are:

- All major events and dates must be clearly defined and noted, if for any reason the customer's milestone dates cannot be met, the customer should be notified immediately with proper delay statement.
- The exact sequence of work should be defined clearly through a network in which an interrelationship between events can be identified.
- Schedules should be directly relatable to the Work Breakdown Structure (WBS). If the WBS is developed according to a given or specific sequence of work, then it becomes an easy task to identify work in working sequences in schedules using the same numbering system as in the given WBS. The minimum requirement should be to show when all tasks start and finish.
- All the schedules must identify the time and cost constraints, if possible, then should identify those resources required for each event to perform the execution.
- As the lead and lag plays a vital role in the project management.
- Follow up of the critical path is very important as it carries a major activity.
- Proper allocation of resource leads to cost optimization in the project.

Project Charter: The original concept behind the project is to identify and showcase the role of project manager's in construction and responsibility, especially for projects operated away from Head office. We can say that Charter is a legal agreement between the project manager and the client or company. When the project charter contains a scope baseline of work and management plan, the project charter may function as same as the project plan.

Project Ideals: An ideal provides a measure for satisfactory and success. Better achievement of the project ideal will never satisfy a client or a company because the project ideal can never be achieved. Improvements in the project ideal gives a knowledge about companies a competitive advantage in the market place. Doing project at lowest cost possible is an example of a project ideal. For example, organizations and firms that develop new products often try to be the first to market. Their project ideal is to complete the task in shortest time as possible. These organizations would be happy if the product development lifecycle shrunk from 36 months to 12 months to 4 months - or a better, to a single month (and best of all that we have if it were all done yesterday). The ideal will never be achieved entirely; it guides your direction, but it is not a final target. When will we have new products that appear immediately?

Common project ideals can be easily identified. Project managers typically strive towards one of the following requirements of a client.

Highest client satisfaction: Some of the projects have only one client with an impossible challenge. A project that changes the salary system of an organization may have the maximum numbers of the satisfaction of the employees. You can never satisfy all employees, but the challenge here is to satisfy as many as employees as possible.

Highest quality with deliverables: At the top-end of the market is where the competition on quality takes place. The competition often focuses on simply and objectively measured quality standards, like processor speed in the computer chip market, storage capacity in small memory, energy-production in solar panels or energy storage capacity in batteries. They will never be high enough;

the bar in a gnat chart is always rising. Software development projects often suffer from bugs. Clients desire bug-free software, but that ideal will never be satisfied or realized, unfortunately.

Shortest time as possible: Research and development organizations that developed daily new products often try to shorten their development cycle on the market. If you could deliver it yesterday that would be the best. The current race for steel and cement are the two best examples.

Lowest cost possible: Low-cost construction is a term used to refer to creative and innovative ideas of planning your budget efficiently and not necessarily degrading the quality of materials been used for development. The Construction Labor Market Analyzer, our construction labor cost percentage should be anywhere from 20% to 42% of total costs.

Project Constraints: The difference is that the closer you come to project ideal, the more satisfied the client will be. The client won't necessarily be happy yet. Only if constraints are met will the client be happy and the project to be considered as a successful. Project managers mostly face the challenges of maximizing the project ideal with respect to project constraints. Then if all goes well during project execution, the client will be happy.

When constraints are met, the project isn't necessarily successful, but it isn't a failure either. Where ideals are the criteria for success, constraints are the criteria for failure. For clients, ideals are satisfiers, whereas constraints are dis-satisfiers in whole project.

The different types of project constraints are:

- (a) Knowledge-constrained
- (b) Time-constrained
- (c) Cost-constrained
- (d) Resource-constrained

The Project management plan usually contains component plan which describes the base plan:

- (a) Scope Management Plan: Describes the scope baseline of a project which includes scope statement of project, and WBS.
- (b) Schedule Management plan: Describes the steps for planning, monitoring and controlling the schedule of a project.

Network Scheduling Techniques: Management is continually seeking a new and a better control techniques for the complexities, masses of data and fixed deadlines that are the characteristics of highly competitive industries.

Scheduling Techniques helps achieve these goals. The most common techniques are

- Gantt Charts or bar charts
- Milestone charts
- Networks
- Programme Evaluation and Review Technique.

In the early 1960s, the basic requirements of PERT or time were as follows:

- All of the current tasks required to complete a project must be clear enough to be put down in a network, which comprises events and activities i.e., follow the work breakdown structure (WBS).
- All the required events and activities must be in proper sequenced on the network under a highly logical set of ground rules that allow the determination of critical and subcritical paths. Networks may have more than one hundred events, but not less than ten.
- Estimation of time must be made for each activity on a three-way basis. Optimistic, most likely, and pessimistic elapsed time figures must be estimated by the person(s) most familiar with the activity.
- Critical path and slack times are computed. The critical path is that sequence of activities and events which acquired will require the greatest time.

Networks are composed of events and activities. The following terms are helpful in understanding the networks:

- Event: Event is a equivalent to a milestone indicating when an activity starts or finishes.
- Activity: The activity is an element of work that must be accomplished.
- Duration: It is a total time required to complete the activity.
- Effort: It is a amount of work that is actually performed within a duration. For example, the duration of an activity could be two months but the effort could be just a five-week period within the duration.
- Critical path: This is the longest path through which the network determines the duration of the project. It is also the shortest amount of time necessary to accomplish the whole project.

For a complex construction projects, use of Microsoft project planning tools like MSP 2016, Primervear P6 is suggested for project manager.

Agile Project Management: As companies become reasonably mature in project management, there is a tendency to go from formal to informal project management, minimize the need for excessive documentation (possibly even hoping for paperless project management), and trust that the project team will make the right decisions. In order to support the existence of the more informal approach to project management, techniques such as agile project management have surfaced. There are several forms of agile project management. Agile Project management characteristics are:

- Structured focus on people
- Leadership style is participative.
- Amount of documentation is minimal
- Customer feedback throughout project.

- Project direction is respond to change
- Constantly evolving solution.

4. REFERENCES

- [1] Mr. Shrikant R Kate, April 2018- Assistant Professor, Vaishali Joshi – 1 January 2017- Assistant Professor, Department of Civil Engineering, RMD Singhad School of Engineering Warje, Pune, India. Resource Scheduling in Construction Project Using MSP
- [2] Research Scholar Civil Engineering, Department, Trinity Academy of Engineering, Pune, India, Planning of Multi-Storey Building Using Advance Tools and Techniques
- [3] Prof. Shashank U. Vanakudar-june2018- Assistant Professor, Civil Engineering Dept., Kain College of Engineering, Belagavi, Karnataka, India