



Evaluation of Construction Planning Process

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Abstract

The main objective of this research paper is to put an eye on the construction planning process and its method in order to determine which one is the best method to use before starting projects, such as multi-story buildings, houses, roads, highways, airports, and so on. Each of these methods is used for work schedules; they could be different in the way of giving less or more information and selecting them would be based on the goal of our project and project requirements. To do this requires an understanding not only of planners' work but the context in which such work takes place. There is comparatively little written work on conceptual planning in particular areas of construction. Moreover, to get a brief ideology on the construction planning phases, especially on construction planning process.

Keywords: construction planning, pert, Gantt chart, s-curve, construction phases.

Introduction

Construction planning is a fundamental and challenging activity in the management and execution of construction projects. It involves the selection of technology, the definition of work tasks, estimation of the required resources and durations for each task, as well as identification of any interactions between work tasks. A good construction plan is the basis for developing the budget and the schedule for work. Developing the construction plan is a critical task in the management of construction, even if the plan is not written or otherwise formally recorded. In addition to these technical aspects of construction planning, it may also be necessary to make organizational decisions about the relationships between project participants and even which organizations to include in a project. Construction planning often determines how much subcontractors will be used on a project.

Steps or Phases of construction cycle:

Following are the main phases of the construction planning process which can be used by any organizations, the first hurdle when establishing a construction project is understanding how to be successful at the various stages of the construction process. What is the best way to begin a construction project? How do you successfully end it?

Understanding each phase of the construction life cycle requires a deep dive into the individual requirements of each stage and how they work together for the project to ultimately succeed. This is made only more complicated if an organization is still over-reliant on older or outdated solutions for construction project tracking,

The five phases of the construction project process are:

1. Project Planning and Definition
2. Project Initiation and Conception
3. Project Execution and Launch
4. Project Performance
5. Project Close

In this paper we are going to cover an overview of the first phase in each and every construction phase that is the project planning process.

Significance of project planning

It is the process of selecting a particular method and the order of work to be adopted for a project from all the possible ways and sequences in which it could be done. It essentially covers the aspects of 'What to do' and 'How to do' or in other words Construction project planning is the act of creating a development plan for a construction project. In general, the goals of a construction project planning are as follows:

- Define the work tasks of each entity involved in the project.
- Illustrate the relationship between different work tasks and the individual entities that are performing those tasks.
- Make decisions about which technologies will be used to bring about the successful completion of the project.
- Provide a comprehensive assessment of all resources required to complete a project.
- Use the plan to arrive at a timeline and budget for the project.

what the general goals of construction planning are, but you might be wondering what the purpose of a construction project plan is. At a high level, the purpose of a construction plan is to provide a durable document that will guide a project from idea to completion. By serving as a guidepost and reference point, a strategic plan developed at the beginning of a project will allow project stakeholders to verify that the project is adhering to the original stated goals as it progresses. (3)



Fig no 01 fundamental of project planning

On a functional level, construction project planning is necessary to determine an accurate assessment of the costs associated with a project as well as a timeline for completion. No owner wants to find out that the project they thought was going to cost a certain amount of money will cost significantly more. While project costs can go up over time, having the most accurate picture of a project budget at the outset is best for all parties involved. Alongside budgetary constraints, many projects have timeline constraints. Creating a strategic plan allows the project manager to create a more accurate project completion timeline based on a realistic picture that incorporates all the necessary work required to bring about project completion.

Methods of Project Planning

Project managers use different methods of project scheduling to estimate the time required for projects before starting. The period of working on a project can be divided into three parts, which are before, during, and after completion of construction. The first part, before planning, includes planning and estimation of the project duration, cost, materials, number of workers, and sequence of activities. Project scheduling is important because once everything is planned, everyone, including engineers, workers, contractors, and the owner of the project will get an idea about when they must start and finish constructing, how much the project costs, what materials, machines, equipment are needed, how many workers and engineers are required, what type of skills from the workers and engineers are sought, and so on. So during the construction period, most of the issues and operations would be clear and understandable prior to happening.

Another advantage of project planning is that in case of needing a type of material, equipment, or any machine, which might be unavailable in the country, we can order them earlier, so it will be ready to use when needed for a particular activity of the project. Otherwise, it may delay the project for months or more. In the case of the unavailability of any type of machine or materials during the construction process, everyone has to wait and delay their job, including workers and engineers. So before starting any project, the project manager, engineers, and supervisors must make sure of the material deliveries on time.

Critical Path method:

This Method was developed “in the late 1950s”, and since then, it is used widely for scheduling projects, especially in construction, aerospace and defence, software development, IT, etc. In this method, activities are connected by using dependencies in a network diagram and forming paths, making forward and backward calculations. The critical path

of a project can also be determined using software, for instance, “Primavera P6 or Microsoft Project helps to analyse the critical path of a project which consists of thousands of activities.

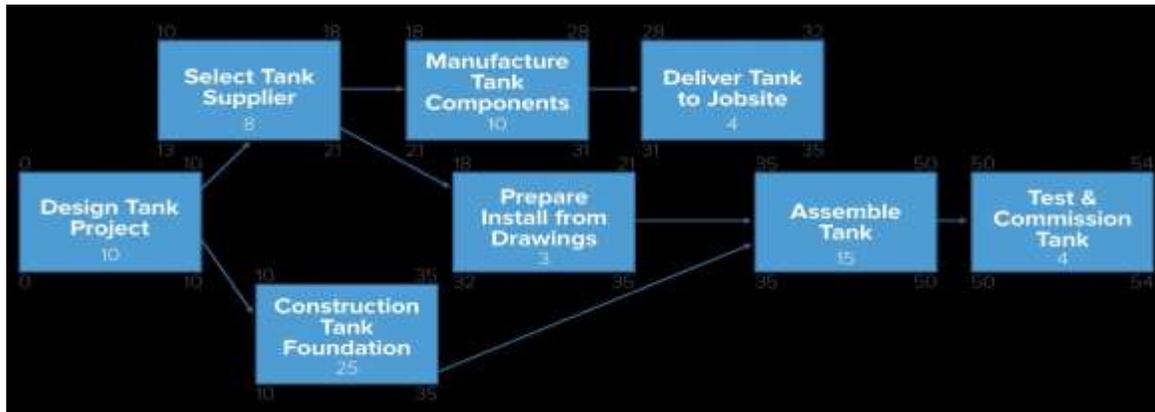


Fig no:02 critical path method.

In this method, activities should be listed according to which activity proceeds and which activity follows. We can use this method to determine after how many months, weeks, or days the construction project will be completed, and it clarifies the construction process for workers, contractors, engineers, and supervisors to understand the process and deadlines for each activity in the project. In other words, this method tells the earliest starts (ES), earliest finishes (EF), latest starts (LS), and latest finishes (LF) of each activity in the project. I believe this method is much more efficient than other methods for scheduling because this method gives information about the duration, earliest start, and the deadline, in which each activity should be completed.

Gantt Chart

Gantt Chart is one of the easiest methods of the project schedule to prepare. Its activities are represented as bars and the length of each bar represents the activity duration. The beginning and the end of the bar show the start and end date of each activity. Depending on the project execution plan and resource availability, these bars may be sequential or run in parallel (Kathy). A simple Excel Template can be used to make a Gantt Chart and update it whenever needed. Gantt Charts can be used to schedule and plan any kind of construction project using Excel templates. First, the activities are listed in the first column and their durations in the second column. Then the dates of starting and ending the project are filled up at the top in the first row.

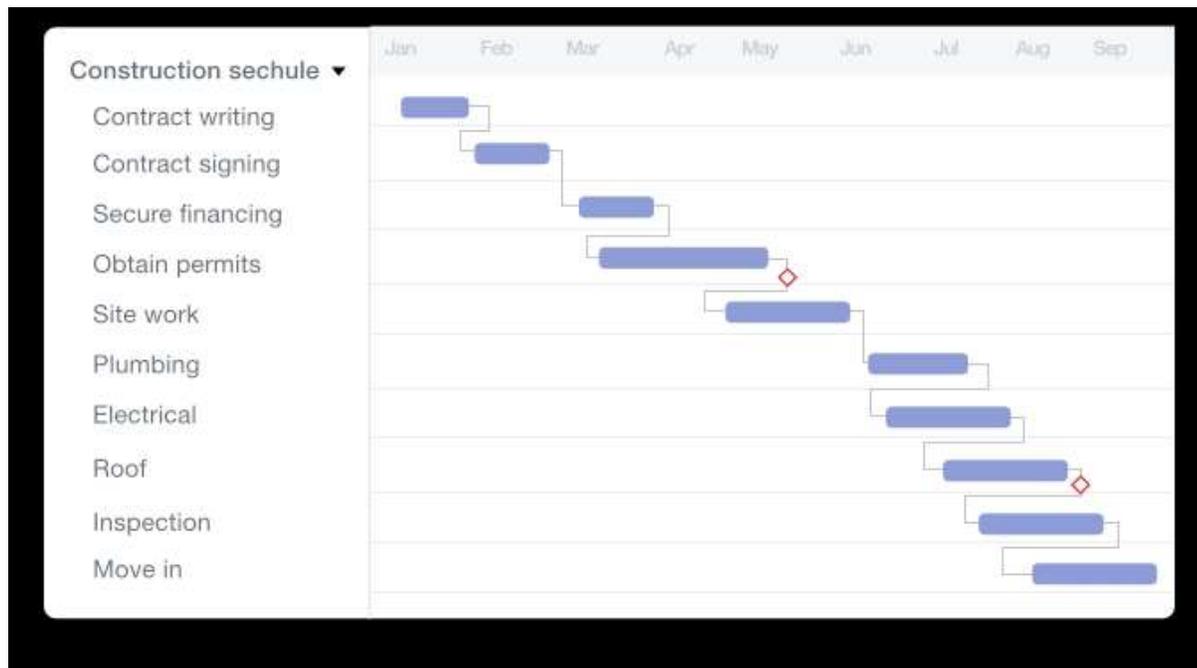


Fig no 03 Gantt chart.

After that, a horizontal bar is drawn for each activity according to its time required. The Gantt Chart is basically a diagram representation of the critical path method. The advantage of a Gantt chart is that any information can be added by putting them in an extra column. For example, the information, including the duration, cost, ES, EF, LS, and LF could be represented in the chart, too. Same as the critical path method, we can easily figure out the ES, EF, LS, and LF on the graph.

Program Evaluation and Review Techniques (Pert):

This was developed by the “US Navy in the late 1950’ s for Ballistic Missile Program” in order to find a simple system to organize complex objectives and thousands of contractors. In this method, the longest path can be identified by making forward and backward calculations.

The PERT method seems more difficult to use because it requires learning a software program in order to make a schedule. In this method, the duration of each task is calculated by three estimation techniques, which are most likely estimates, optimistic estimate, and pessimistic estimate. Optimistic estimates compute the shortest time required for finishing a task, pessimistic estimates compute the lengthiest time needed for finishing a task, and most likely, they compute the longest time possible to finish a project. Thus, the average estimated time could be calculated.

Work Breakdown Structure:

This is an outline of the construction project with different levels of detail. This method categorizes all the tasks of a work project into subsections in a hierarchical structure, and it shows their relationship with each other. This method also serves as a framework for tracking cost, work performance, and progress.

Resource Allocation Chart:

This method is used in projects where there is a competition between activities for project resources. The Resource Allocation Chart method is very similar to the Gantt chart except that in the Gantt chart, Resources could be considered as materials, specific labour types, transportation resources, and so on. This method

shows the starting, ending, and duration of each activity in a table. However, this method doesn't give enough details similar to other methods. Both planned and actual work are shown, but only the planned work is shown in the resource Allocation Chart.

S-curve (cumulative progress chart):

This is a graphical representation of project progression in percentage versus time. Same as the Gantt chart method, this method presents both the planned and actual scheduling of the project. The purpose is to see the difference and progress of the work and improve future scheduling. Similar to the time-scaled arrow diagram, this method only shows the duration, starting, and finishing date of each activity without deciding on the earliest and latest start with the earliest and latest finish. It is also called cumulative progress chart.

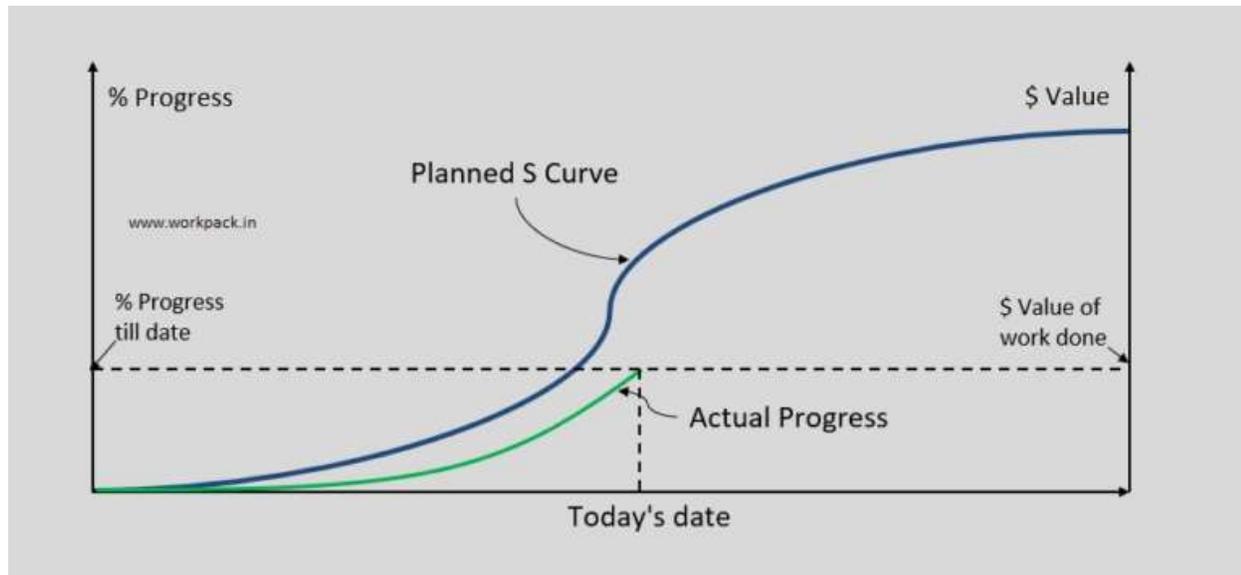


Fig no 04 s-curve

As a result, the best method to use for project scheduling and planning based on what previously were mentioned could be the Gantt Chart Method. In the Gantt Chart method, the weight of each activity is determined; the cost is calculated in a separate column; the planned and actual working dates are recorded and could be shown.

Consequences of Delaying Construction Projects

Construction Projects are essential requirements and need to be done to meet the population demand and necessities. Delays in construction projects are common around the world, especially when the government is involved. For an idea in Mumbai "4 out of 10 infrastructure projects are behind the scheduled deadline". One of the consequences of project delay is the increase in the project cost like sometimes the cost increases about 20 times the original cost. For example, delaying a railway conversion project on the Bankura-Damodar stretch in West Bengal the original caused the project to cost more than the original price, which is from ₹ 111.9 crores to ₹ 2,371.85 crores (1 crore is 10 million). So when a project is delayed, a huge amount of money is going to be spent and wasted, however, that amount could be invested for other projects or used for buying new equipment. There is much Data showing that the delay in construction projects causes time overrun and cost overrun.

Benefited of construction planning process

- the ability to forecast resource requirements and costs.
- the ability to develop more realistic schedules with clear time deadlines.
- the ability to communicate with clear and reliable information to project stakeholders.

- providing reliable information for risk and opportunity assessment.
- providing good information for monitoring and control.
- minimizing materials wastage; and
- providing a strong basis for team coordination and assisting in the negotiation of contractual claims

Conclusion

We have reviewed all the methods available, and we have come to the conclusion that Gantt charts provide most of the information required for contractors, workers, and everyone else working on the site during the construction process. This method will allow determining the weight, progress, cost, actual and planned work, duration of each activity, and it is very understandable and gives clear information. Planning reduces the amount of delays and supports the project run much more smoothly.

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