

Project Planning & Scheduling

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ABSTRACT

Large Planning is a general term that sets a clear road map that should be followed to reach a destination. The term, therefore, has been used at different levels to mean different things. Planning involves the breakdown of the project into definable, measurable and identifiable tasks/activities, and then establishes the logical interdependences among them. These plans involve four main steps:

- Performing breakdown of work items involved in the project into activities.
- Identifying the proper sequence by which the activities should be executed.
- Activities representation.
- Estimating the resources, time, and cost of individual activities.

Planning requires a rigorous effort by the planning team. A planner should know the different categories of work and be familiar with the terminology and knowledge used in general practice. Also, the planning team should seek the opinion of experts including actual construction experience. This helps produce a realistic plan and avoids problems later on site.

I. INTRODUCTION

Construction planning is a fundamental and challenging activity in the management and execution of construction projects. It involves the choice of technology, the definition of work tasks, the estimation of the required resources and durations for individual tasks, and the identification of any interactions among the different 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 tasking 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.

Essential aspects of construction planning include the generation of required activities, analysis of the implications of these activities, and choice among the various alternative means of performing activities. In contrast to a detective discovering a single train of events, however, construction planners also face the normative problem of choosing the best among numerous alternative plans. A planner must imagine the final facility as described in the plans and specifications.

PLANNING:

Planning is a defined Process to achieve the Targets in a systematic approach within the stipulated Cost, Time with the Optimum Utilization of resources.

REQUIREMENTS OF PLANNING

1. Knowledge on scope of work (Quantity & value) and understanding the project.
2. Duration, Sequence, Milestones and Priorities.
3. Identifying the resource and analyzing the availability of resource.
4. Site condition (Access & Timing)
5. Climatic condition of the locality.
6. Understanding the Specifications & Methodology.

What to Plan?

- a. Time
- b. Resource
- c. Cost

Why to Plan?

To ensure the project is completed

- a. With high quality
- b. Within the stipulated Time
- c. Within the Budgeted cost using optimum resources.

When to Plan?

- a. Prior to Work
- b. During Work
- c. After the Completion of Work

PROJECT PLANNING STEPS

The following steps may be used as a guideline, or checklist to develop a project plan:

- Define the scope of work, method statement, and sequence of work
- Generate the work breakdown structure (WBS) to produce a complete list of activities.
- Prepare the logic or network diagram to establish a relationship among activities and integrating these diagrams to develop the network model
- Analyzing the project network or models to determine project duration, and identifying critical and non-critical activities
- Exploring trade-off between time to cost to arrive at optimal time and costs for completing the project.

- Establishing standards for planning and controlling men, materials, equipment, costs and income of each work package.
- Forecasting input resources, production costs and the value of the work done.
- Forecasting the project budget allocations for achieving targets assigned to each organizational unit
- Designing a control system for the organization.
- Developing the resources, time and cost control methodology.

PROJECT PLANNING TECHNIQUES

Stage – Project Planning

Planning Process - Breaking down project Work, developing time network plans.

Techniques/methods - Work break down, network analysis, gnart chart
Stage – **Planning Resources**

Planning Process - Forecasting resource requirements, planning manpower requirements, planning material requirements, budgeting costs, designing organizational structure.

Techniques/methods - Man power scheduling Material scheduling Resource allocation Cost planning & budgeting Equipment Selection and scheduling

Stage – Planning implementation

Planning Process - Formulating monitoring methodology.

Techniques/methods - Resource productivity control, time control, contribution control, budgetary control

PROJECT SCHEDULING

Scheduling means putting the plan on calendar basis. A project network shows the sequence and inters dependencies of activities, their time and their earliest and latest completion time, but these needs to be scheduled to determine commencement and termination dates of each activity. Using optimum resources or working within resource constraints, it is a time table of work. A basic distinction exists between resource oriented scheduling techniques. The project is divided into number of operations.

FACTORS AFFECTING PROJECT SCHEDULING

(a) Time:

Most of the projects carry time constraints in the form of imposed dates, these dates may include constraints on start and completion of activities.

(b) Manpower:

Man power is one of the main in the successful execution of projects. The idle labour time is paid for and the strikes and breakdown of work are kept in view by manpower.

(c) Materials:

Construction materials are increasingly becoming scarce and their procurement is a time consuming process. The schedule aids in forecasting of materials and their timely supply determines the economics and progress work.

PROJECT SCOPE:

The project scope outlines the intended result of the project and what's required to bring it to completion. In this scope, you'll include all the resources involved and cost and time constraints. With this project scope, a work breakdown structure (WBS) is developed, which outlines all the tasks and breaks them down into specific deliverables. You can extract the list of tasks that need to be completed. To be clear, the WBS outlines what needs to be done – not how or when. Once you have the list of tasks, you can sequence them in the right order and estimate the time and resources required to bring them to completion. Resources start working on their tasks, deliverables are completed, meetings are held and status reports and development updates are submitted during this phase.

II. OBJECTIVE

1. We understand the scope of the project and are pro-active both in interpreting the Clients requirements and producing project schedules. The project team effectively 'buys-in' and owns the project schedule.
2. Planning and scheduling information and documentation is produced which can be effectively utilized by project team members. The schedule is pro-actively analyzed & reviewed to identify any potential restraints to progress. Any restraints identified being reviewed with all appropriate project team members, including the Project Manager.
3. The objectives of the Global / Regional / Industry / Quality Systems are met. To study an on-going construction project with focus on project Planning & Scheduling and preparing necessary documents.
4. To identify the specific methodologies that can be adopted in the project for Planning & Scheduling. To identify scheduling technique used in developing Planning and Scheduling.
5. To discuss the effectiveness of the methods and their usefulness for construction project process.
6. Use of computer software like Microsoft project software, which is most widely and globally used.

REQUIREMENTS FOR UNDERSTANDING THE PROJECT:

1. Client / Customer / Consultants
2. Type of Project / Nature of Work
3. Type of Contract
4. Project Location & Layout
5. Master Plan / Area to be Built
6. Detailed Arch Plan
7. No of Structures / Units
8. Phase of Construction

9. Scope of Work
10. Items of Work to be executed
11. Volume of Work (Qty)
12. Specifications
13. Cost of the Project
14. Time Duration
15. Specific Tech Requirements (Milestones / Priorities / Quality Requirements)
16. Infrastructure Facilities
17. Commercial Terms & Conditions
18. Statutory Norms & Regulations

PROJECT MOBILIZATION

Setting up the Basic infra structure facilities to start the project.

Project Mobilization Requirements:

- a. Temporary Structures like Site Office, Store, Cement Godown...
- b. Power & Water Arrangements
- c. Safety & Statutory Requirements
- d. Quality Lab Facilities
- e. Labour Shed Facility
- f. Staff Accommodation
- g. Plant & Machinery Set up Plan / Yards
- h. Tools & Tackles.

MICROSOFT PROJECT SOFTWARE

Microsoft Project is the world's most popular **project** management **software** developed and sold by **Microsoft**. The application is designed to assist **project** managers in developing plans, assigning resources to tasks, tracking progress, managing budgets and analysing workloads.

Microsoft Project is a project management software product, developed and sold by Microsoft. It is designed to assist a project manager in developing a schedule, assigning resources to tasks, tracking progress, managing the budget, and analyzing workloads.

Microsoft Project was the company's third Microsoft Windows-based application. Within a few years after its launch, it became the dominant PC-based project management software.

It is part of the Microsoft Office family but has never been included in any of the Office suites. It is available currently in two editions, Standard and Professional. Microsoft Project's proprietary file format is .mpp.

Microsoft Project and Microsoft Project Server are the cornerstones of the Microsoft Office enterprise project management (EPM) product.

FEATURES

Project creates budgets based on assignment work and resource rates. As resources are assigned to tasks and assignment work estimated, the program calculates the cost, equal to the

work times the rate, which rolls up to the task level and then to any summary tasks and finally to the project level. Resource definitions (people, equipment and materials) can be shared between projects using a shared resource pool. Each resource can have its own calendar, which defines what days and shifts a resource is available. Resource rates are used to calculate resource assignment costs which are rolled up and summarized at the resource level. Each resource can be assigned to multiple tasks in multiple plans and each task can be assigned multiple resources, and the application schedules task work based on the resource availability as defined in the resource calendars.

All resources can be defined in label without limit. Therefore, it cannot determine how many finished products can be produced with a given amount of raw materials. This makes Microsoft Project unsuitable for solving problems of available materials constrained production. Additional software is necessary to manage a complex facility that produces physical goods.

The application creates critical path schedules, and critical chain and event chain methodology third-party add-ons also are available. Schedules can be resource levelled, and chains are visualized in a Gantt chart. Additionally, Microsoft Project can recognize different classes of users. These different classes of users can have differing access levels to projects, views, and other data. Custom objects such as calendars, views, tables, filters, and fields are stored in an enterprise global which is shared by all users.

CONSTRUCTION PLANNING SCHEDULES

SCHEDULES FOR MONTHWISE QUANTITY - In this Schedule the activities involved in the project are listed and the quantity for the various works month wise is calculated. This Schedule helps in the month wise mobilization of materials, Plant & Machinery and Manpower.

SCHEDULES FOR MONTHWISE INVOICING - In this Schedule the invoicing month wise is calculated. The average rates are taken from the Bill of Quantities from which the month wise Invoice is calculated.

CASH FLOW CHART (CUMULATIVE & MONTHWISE) – The Invoicing is done for each month and from these data the Cash flow chart is prepared Month wise and cumulative for the entire Project Duration. This cash flow helps in the allocation of funds.

SCHEDULE OF MANPOWER REQUIREMENT – The manpower required for the project includes the skilled labours like Barbender, Carpenter and Mason and the unskilled labours working in the project. By this Schedule the number of skilled and unskilled labours required for the project in each man day is calculated. This schedule helps in the mobilization of the manpower and also for their optimum utilisation.

SCHEDULE OF BULK MATERIAL REQUIREMENT – The Bulk materials in the project includes materials like Cement, Steel, fine aggregate, coarse aggregate, blocks, bricks etc. Using the standard coefficients the bulk material quantities are calculated month wise. This schedule helps in the mobilization of the Bulk materials and also for their optimum utilisation.

SCHEDULE OF SPECIALIZED AGENCIES – The specialized agency includes the agency that are doing special works like waterproofing, joineries manufacture, external finishes like ACP cladding etc. So it is important to prepare a schedule which enables the project completion without delay with complete Quality requirements.

III. CONCLUSION

Planning is the most important process for the successful completion of the project. By the method of Time planning it is ensured that the Project is completed within the allocated Time without any delay. In case of any delay or hindrance in the Project alternative solutions are being arrived at for the successful completion.

The resources in the Project include Materials, Manpower and Plant & Machineries. By the method of resource planning the resource requirement for the project is calculated and the optimum utilization of resources without wastage is ensured in the Project.

By the method of cost planning it is ensured that the Project is completed within the allocated Budget and also satisfying the Quality Requirements.

The Management Planning Construction Schedules helps in the proper planning of the project. The Microsoft project helps in the scheduling and Tracking of the Project and indicates the delay.

IV. REFERENCE

1. “Basic Introduction to Project Planning & Scheduling” by Jackie Gilliland emphasis - which the Project planning, scheduling and control and project management is explained in Detail.
2. “Project Planning & Scheduling” by Gregory T Haugandid the Studies and makes all planning methods and tools available to project managers at all levels easy to understand... and use.
3. “Project Planning, Scheduling & Control” by James P Lewis - Thoroughly updated to encompass the tremendous technological and workplace changes of the past decade--with exceptional illustrations and graphics to illuminate key points--this clearly written, applications-oriented project management blueprint reveals easy-to-follow.
4. “Planning, Scheduling , Monitoring & Control” by Simon Addy manin his book offers practical guidance on all planning aspects of preparing to undertake a project, executing a project, controlling its delivery to budget, time and quality, and delivering it safely.
5. “Construction Planning& Scheduling” by Andrew Baldwin & David Bordoli -presents the key issues of planning and programming in scheduling in a clear, concise and practical way.
6. “Construction Project Scheduling & Control” by Saleh A Mubarak – The study provides a comprehensive examination of the analytical methods used to devise a reasonable, efficient, and successful schedule for construction projects of all sizes.
7. “ Maintenance , Planning, Coordination & Scheduling” by Don Nyman & Joel Levitt - Based on real-world experience this invaluable guide and reference tells the whole story of maintenance planning from beginning to end in a concise and easy-to-follow manner.

8. “Project Scope Management “by Jamal Moustafaev describes how to elicit, document, and manage requirements to control project scope creep. It also explains how to manage project stakeholders to minimize the risk of an ever-growing list of user requirements.
9. “ Effective Work Breakdown Structures “By Dr. Gregory T. Haugan clearly states that WBS is a foundational building block to initiating, planning, executing, and monitoring and controlling processes used to manage projects. Resource Breakdown Structure (RBS) describes the project's resource organization, and can be used with the WBS to define work package assignments.
10. “ Practice Standard for Scheduling” By Project Management Institute provides the latest thinking regarding good and accepted practices in the area of scheduling for a project. In this new edition of the practice standard, you will learn to identify the elements of a good schedule model, its purpose, use, and benefits.