Application Of A Project Planning Methodology In Construction Work

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Abstract:

To study and carry out a Project Planning & Management Methodology and apply to a specific Civil Construction project, a School Building complex. The Construction Project shall employ the latest and the best available Project Planning and Management package (eg. Primavera Project Management, one of the most sought after software package employed by a large group of Industries, world over).

The Project Planning and Management aims to ensure that Project deliverables (as per the Scope definition) are completed and delivered in time, within the stipulated (Budgeted) cost, and meets the stakeholders requirements and expectations. It also adopts methods, control processes in monitoring and implementation to reduce as best as possible any chances of failure at some stage or another. For the present study, the Planning Process for a Building Construction with some alternative schemes such as execution schedule, activities (tasks) relationships, resource allocation etc has been attempted to examine the consequence of overall implementation in terms of Scope, Time and Cost to the project. The Project Planning & management package offers window of opportunities to plan various alternatives and examine pro and cons of the project.

1.Introduction

A Project is a temporary Endeavour undertaken to create a unique product or service. Moreover, a project can be defined as a group of tasks performed in a definite time period to meet specific set of objectives or the scope, time, cost, risk and performance of the project.

1.1.Program

A Program is a group of related projects managed in a coordinated way by Project Manager.

1.2.Portfolio

management to meet business objectives, managed by Senior Management.

1.3.Project management

Project Management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements. The elements of Project Management control include programmed objectives, policy restrictions, resource constraints, government regulations, feed back and revision of objectives

1.4.Planning

Planning a project includes: working out when, where and who is going to do the project. The crucial part of successful project management, however is the actions you take after the project plan is created.

1.5.Planning Helps to Avoid

- Delays in Project work

- Lost revenue

- Loss of facilities

- Additional changeover cost

- Inconvenience costs

- Contractual Disputes

- Extension of Time claims

1.6.Planning aims to

- Optimize time

- Estimate or reduce uncertainties

- Improve efficiency of operation

- Obtain better understanding of the objectives

- Optimize Resources

- Provide a basis for monitoring and controlling work

- Provide early warning of Potential problems

- Take proactive and not reactive actions.

1.7.Enterprise Project Management

EPM is ideal for organizations that need strong coordination and standardization between projects and project managers, centralized resource management or higher level reporting about projects and resources.

EPM provides infrastructure so that organization can gain visibility, insight, and control its portfolio of projects, as well as improve productivity, reduce cycle time, decrease costs and increase quality.

1.7.1. Milestones

Milestones are key events/ point of time which can be identified when they are completed during the projects progress.

Project Milestone schedules contain:

- Project start date
- Project end date
- Other major milestones
- Data items (deliverables or reports)
- Review Meetings, prototype availability, procurement, testing etc can be identified as milestones.

1.7.2. Primavera Project Management

Primavera is a project, cost, and resource management software that enables organizations to make informed decisions and improve their ability to deliver programs and projects on time and on budget through the capture and reuse of best practices. Primavera creates a collaborative environment through its set of integrated components with easy to use, personalized interfaces for all project stakeholders.

1.7.3. Project Management Module

- Comprehensive, multi-project planning and control software built on Oracle and MS SQL Server.
- The module can stand alone for project and resource management, or it can be used in conjunction with other components.
- Enables Organization to store and manage its projects in a central location.
- The module supports WBS(Work breakdown Structures), OBS(Organization breakdown Structures),EPS(Enterprise Project Structures).
- Project Management Module Provides:
- EPS- which enables project managers to manage multiple projects from highest level to individuals who perform specific project tasks. Multiple users can access the same project concurrently.
- Centralized Resource Management, including resource time sheet approvals and ability to communicate with project resources.
- Integrated Risk Management.
- Issue Tracking.
- Manage by threshold.
- Work product and documents. Report Wizard to customize reports.

1.8.*Project Management Knowledge areas*

- Project Integration Management This knowledge area focuses on project plan develop and execution.
- Project Scope Management This knowledge area deals with the planning, creation, protection, and fulfillment of the project scope.
- Project Time Management Time management is crucial to project success. This knowledge area covers activities, their characteristics, and how they fit into the project schedule.
- Project Cost Management Cost is always a constraint in project management. This knowledge area is concerned with the planning, estimating, budgeting, and control of costs.

- Project Quality Management This knowledge area centers on quality planning, assurance, and control.
- Project Human Resource Management This knowledge area focuses on organizational planning, staff acquisition, and team development.
- Project Communications Management The majority of a project manager's time is spent communicating. This knowledge area details how communications can improve.
- Project Risk Management Every project has risks. This knowledge area focuses on risk planning, analysis, monitoring, and control.
- Project Procurement Management This knowledge area involves planning, solicitation, contract administration, and contract closeout.

1.9.Areas of Expertise

- Management Body of Knowledge
- Application area, standards and Regulations
- Project Environment
- Management Knowledge and Skills
- Interpersonal Skills.
- Interpersonal Skills
- Effective communication
- Influencing the Organization – The ability to get things done
- Leadership
- Negotiation and conflict management
- Problem solving

2.Methodology

Project Planning and Management can be broadly categorized into five basic processes as below:

2.1.Scope Planning

This is an important and foremost step in deciding/definition the Project scope (the work packages and deliverables) and modality to plan and manage scope changes as and when it occurs. It plans for acceptance criteria for deliverables. The scope is decomposed into groups and subgroups (known as WBS (Work break down structures).

2.2.Resource Planning

The resources to be employed for performance and completion of Tasks are identified, estimated and their time and period of deployment are planned as worked out by the team (WBS level).

2.3.Time Estimate and Planning

The duration of accomplishing the tasks by the resources are estimated and planned. The activities are networked suitably establishing the relationship dependencies (FS – Finish to Start, SS – Start to Start, FF- Finish to Finish, SF-start to Finish) with leads or lags in the dependencies. The constraints in activities and resources are reckoned and incorporated in the Planning Process.

2.4.Schedule the Planned Activities

Based on the Activities network and Time durations the Schedule of Activities are worked out to determine the Start and Finish date of Activities.

2.5.Assign Resources

- The Resources can be categorized as (a)Labor (Human Resources) (b) Non labor (Miscellaneous types , Training, Travels, Rentals etc) and (c) Material. The resources (and or Roles) are assigned to activities.
- The resources are examined for over allocation and suitably leveled to make the Project Planning feasible and suitable for execution.

  The entire Project Planning is scheduled and submitted for review and acceptance /approval.

At this stage, the entire project is saved as a Baseline (Reference) project.

Project Execution and Monitoring: As the project gets going, the execution status is reviewed for Progress monitoring and reports are generated as per communication planning. The monitoring of parameters are % Complete, Schedule Variance, Cost Variance, Performance Index. The data so obtained are analyzed and any corrective action required is planned and implemented.

The lesson learned, the risks involved, the constraints, assumptions etc are   all documented.

The closing process as planned and stipulated is executed at the end of Project (or Plan Phase) completion and delivery of end result to the customer.

2.6.Project Monitoring And Controlling

As the project takes off for execution and implementation it is necessary to keep track of the progress at various phases, or periods by taking stock at review/monitoring meetings and enter the relevant information regarding execution of the Activities as on date. The information needed for progress are:

- Actual Start Date
- Actual Finish Date
- If the Activity is under Progress % Complete.
- Remaining Duration to Complete.
- Units of Resources used up.
- Remaining units of resources to complete the Task (Activity)
- Actual expenses incurred and Remaining to complete.

EVM (Earned Value Method) of Monitoring and Controlling the Project.

Earned Value Techniques

- BCWS (Budgeted Cost of Work Scheduled) – PV, Baseline
- BCWP (Budgeted Cost of Work Performed) – Earned Value
- ACWP (Actual Cost of Work Performed) – Actual Value
- BAC (Budgeted at Completion) –Total Budgeted Cost
- EAC : Estimated at Completion
- VAC : Variance at Completion
- Earned Value Formulae
- VAC = BAC-EAC
- CPI (Cost Performance Index)=BCWP/ACWP
- SPI(Schedule Performance Index)= BCWP/BCWS
- CV (Cost Variance)= BCWP-ACWP
- SV (Schedule Variance)=BCWP-BCWS
- %Complete=BCWP/BAC
- %Spent = ACWP/BAC
- ETC=EAC-ACWP

The Project is monitored in different Phases for Progress known as Status Review or Data dates.

2.7.Implementation And Monitoring Of Building Projects

Using the Project Planning and Management package of Primavera (P6) we have implemented execution reviews at some specific Data dates by entering Activities status regarding Start/Finish Dates, Activities under progress and % Complete, Duration and cost resources to complete etc.

The Project Status and level of performance is measured by EVM (Earned Value Management) techniques available with the software. This computes important measurable parameters such as

Earned values at Activities and WBS Levels, Schedule Variance (SV) , Cost Variance (CV), SPI (Schedule Performance Index), CPI (Cost Performance Index). A collection of such data periodically enables the management to ascertain the team performance, short comings if any, the necessary proactive steps required as intervention for Project to Stay on course and ensure successful implementation of Projects before the actions taken are too late to remedy situations.

For Management perusal and decision making process a series of Reports at each Review Periods (Data Dates/ Status Dates) can be generated. We have taken some Reports of such nature to examine how the Projects are progressing in comparison to Baseline Project Planning.

2.8.*Reports Of Project Monitoring*

During project execution (implementation) the status of the Project is reviewed in terms of Actual Start/Finish Dates, Work in Progress with % Complete and estimate to Complete the Activities in terms of durations and Resource cost are entered and compared with Planned Budgeted data to measure the level of performance and generate necessary Reports. These reports provide vital information to Project manager, his/her team and management for taking proactive corrective measures (augmenting resources, funding, performance feedback etc) for project to stay on course.

4.Conclusion

The tools and techniques and the methodology of latest of project planning and management enable the management and its team to ensure successful and most scientific method of project planning Primavera project planning package offers a comprehensive project planning and monitoring and controlling platform to examine

alternative what if situations and alternative ways of planning. The primavera project planning package also offers easy to use methods and procedures to work out alternate planning with all what if situations.

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