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Construction Planning, Monitoring & Controlling Techniques Review

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***Abstract*— Project Management modules once considered a necessary commodity in the Realty & Infrastructure construction sector is now viewed as a strategic asset for organizations that wants to remain competitive by quickly adapting to change and accelerating business performance. This paper focuses on the knowledge areas such as scope management, planning strategies, time, and cost control techniques considering Real Estate projects.**

Keywords—project Management, Scope Statement, time control, cost control

I. INTRODUCTION

Many organizations today have a new or renewed interest in project management. Computer hardware, software, networks, and the use of interdisciplinary and global work teams have radically changed the work environment. The U.S. spends $2.3 trillion on projects every year, or one-quarter its gross domestic product, and the world as a whole spends nearly $10 trillion of its $40.7 gross product on projects of all kinds. Worldwide IT spending continues to grow, and Forrester Research predicts that U.S. IT spending will grow by another 5.7 percent in 2005, to reach $795 billion, In 2003, the average senior project manager in the U.S. earned almost $90,000 per year, and the average Project Management Office (PMO) Director earned more than the average Chief Information Officer ($118,633 vs. $103,925).

Only a handful number of construction projects comply on the basis of Quality, Delivery and Cost in a balanced manner. A large number of projects have failed in one or two of the above mentioned aspects including several projects of international repute.

It is observed, the major reasons of failure of a project is the improper management & control of changes, project schedule and project cost. By curbing these 3 vital aspects any project is bound to succeed in a holistic manner.

II. IMPORTANCE

This is a project management module & approach which incorporates tools, systems and techniques which assists the project related demographic in minutely knowing, controlling and monitoring the project constraints of scope, time and cost. The growth of a company is greatly spurred by having an effective hold on these three project constraints.

This module contains the essence and panacea to aspire business development in a new way which can improve productivity, envision success, and accelerate growth. It's time to turn business approaches into reality with real-time visibility, collaboration, and innovation needed to succeed.

Preliminary focus is on scope management, time management, cost management & communication management out of 9 key project management knowledge areas.

III. PRESENT SCENARIO OF OUR INDUSTRY

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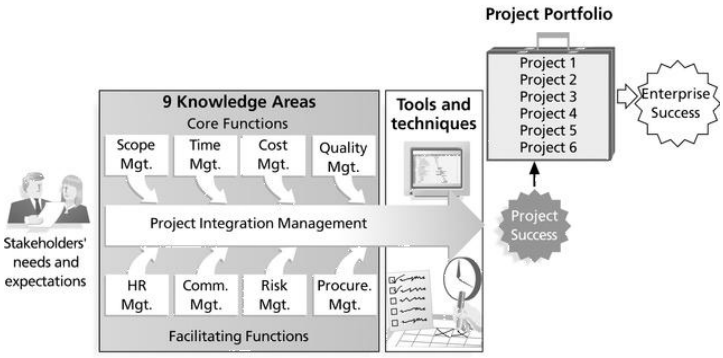

FIG 1. PROJECT MANAGEMENT FRAMEWORK

IV. PURPOSE

1. To ensure that all the projects are planned for efficiently and monitored fortnightly to ascertain & identify delay caused if any.
2. To co-ordinate for providing timely the necessary resources to the projects team so as to achieve the timely project completion.
3. To assure the best possible Engineering cash flow for the financial year is prepared and review / monitor the same so as to ensure the same is achieved as per the target.

4. To assist Project team in preparing recovery schedule in case of delays if any and accordingly achieve the yearly cash flow target.

IV. PROJECT MANAGEMENT MODULES

1. Scope Management

Scope Management is the collection of processes which ensure that the project includes all the work required to complete it while excluding all work which is not necessary to complete it. The Scope Management Plan details how the project scope will be defined, developed, and verified. It clearly defines who is responsible for managing the projects' scope and acts as a guide for managing and controlling the scope.

Steps of Scope Management

a. Collecting requirement first step is the process by which we define and document the requirements needed to meet all project objectives. The foundation of this process is the project charter and stakeholder register. From these, the team can identify requirements, collectively discuss details associated with meeting each requirement, conduct interviews and follow-on discussion to clarify the requirements, and document the requirements in sufficient detail to measure them once the project begins the execution phase. This documentation also serves as an input to the next step in the process which is to define scope.
b. Defining Scope is critical to project success as it requires the development of a detailed project/product description to include deliverables, assumptions, and constraints and establishes the framework within which project work must be performed.
c. Creating WBS process breaks project deliverables down into progressively smaller and more manageable components which, at the lowest level, are called work packages. This hierarchical structure allows for more simplicity in scheduling, costing, monitoring, and controlling the project.
d. Verifying Scope is the process by which the project team receives a formalized acceptance of all deliverables with the sponsor and/or customer.
e. Controlling Scope is the process of monitoring/controlling the project/product scope as well as managing any changes in the scope baseline. Changes may be necessary to the project scope but it is imperative they are controlled and integrated in order to prevent scope creep.

2. Scope Statement

The project scope statement describes, in detail, the project's deliverables and the work required to create those deliverables.

It enables the project team to perform more detail planning, guides the project team's work during execution, and provides the baseline for evaluating whether requests for changes or additional work are contained within or outside the projects boundaries.

However defining the scope is not an easy and simple task in real estate projects. Such definitions start from the senior most management such as business heads or the CEO, considering the market opportunity, and generally it gets end till the completion of the project. In some cases such they may be a result of someone's personal ambition or vision. This vision/ambition/market opportunity forms the first foundation for the start of the definition of the scope. Later this scope is firstly checked on the parameters which testify its feasibility such as Floor Space Index (FSI), DCR, legal Status, market situation in the locality, soil investigation, hydrological investigation etc. After completion of such studies, then comes the designing stage in which the output is firstly prepared, generally the built-up area, number of units etc., and accordingly the design of the project is initiated which is known as Design Basis Report (DBR). After finalization of DBR a Detailed designing of the project is done where in the designs, specification, elevation and plan along with the GFC is prepared which gives the detail depth of the scope of the project and made complete for the start of project for execution. However it has to still to get the approval of the controlling authorities generally municipal and environmental if the project's built-up area is more than 20,000 square meters for a single plot. The scope defined should be satisfactory to both the authorities else-if there might be some scope to be added or removed from the definition. The scope may later get changed during the tendering stage considering the points and issues by the tenderers. And finally the scope gets change after the project has started execution, mainly due to practical difficulty.

3. Time Control Module

For the preparation of Time Control Module the first step is to decide the phasing of the project so accordingly a Master Plan is to be prepared. The level of detailing in this project should not be expected to be of in the range of higher order, however the main controlling factor deciding the tentative duration would be Shuttering sets selected or required and their respective movements, activities which are to be avoided in the rainy season, approval from the authority etc. This Master Schedule would prove to be ineffective if there is no roles and responsibility is assigned to the activities considered. It means assigning appropriate stake holder, personnel, authority, contractor, consultant etc.

After preparation of this Master Schedule, Time control module can be prepared. This master plan for the 1st phase is then later prepared in brief prior the start of the execution of the project i.e. during the mobilization of the contractors. The plan should be complete in all sense related to GFC drawings, milestone, and most importantly the procurement plan. If the procurement plan is missed out in the preparation of the schedule the chances of delay in the project increases substantially because of the longer lead time of the materials.

This detailed plan is then broken down into Monthly, Weekly and Daily plan are prepared from main plan and these are monitored with daily notifications. This detailed plan then needs to be updated weekly or fortnightly or monthly. Deviations should be initially compared to the baseline schedule to compare the schedule with its own reference, and then deviations are to be compared to the master plan to know its effect on the other phases of the project.

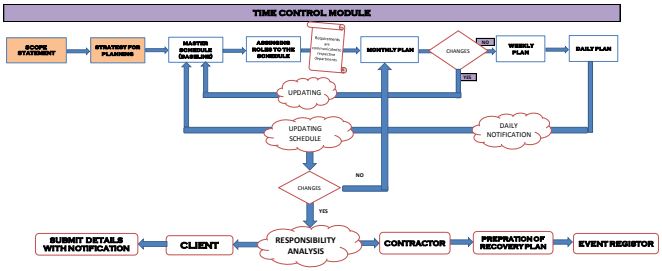

Fig 2. Time Control Flow Chart

4. Cost Control Module:

Cost control basically depends on cost estimate and determines budget. Cost estimate contains contractual details and a strategy prepared to be competitive. Determined budget is the actual component of each item and is reflected by planning and schedule.

Cost control module is prepared for MLESG:

1. M- Material
2. L- Labor
3. E- Equipment
4. S- Subcontract
5. G-General Expenses

The project will be budgeted and controlled in accordance with a Project Code of Accounts and Project Work Breakdown Structure. The project budget will establish the control budget for all project analysis and reporting functions. Cost control consists of the following major elements:

1. Establishing the control structure and philosophy
2. Establishing a control budget
3. Preparing forecasts
4. Preparing cash flow and commitment plans
5. Producing cost reports
6. Project Controls will produce and update the orecast Cost every month.

Cost Control Procedure

The Current Budget and Forecast Cost for the site scope of work will be maintained by the Project Manager. This will be done by comparing and monitoring expenditures, progress and performance to the scope, schedule and budget included in the control budget and utilizing change management to identify and control approved variations to the current budget. Expenditures will be obtained via electronic download from the Finance System.

Contractor progress and associated payment will be determined each month and reported in the Monthly Progress Report. The Site Progress System must be used to determine the status of contractor progress and payment. The Control Budget for contracted work is used as the basis of progress calculations. The Control Budget will reflect all approved deviations for change orders/Contract Modifications, budget shifts, design development deviations in an excess of the design allowance and changes in Issued for Construction (IFC) quantities. The calculation of progress will not be based on forecast man-hours, which could include deviations for direct labour productivity. The forecast man-hours will however be used for manpower forecasting.

V. CONCLUSION

Project Management is a bit complicated subject, most probably with the kind of system/processes it is kept arrested to. With such kind of module it is possible to simply the construction phase and inching towards Leaner Construction processes.

Monitoring the project progress is another key process in project success. Good monitoring system can validate the performance of the project and solve any issues faced to follow the planned schedule. This can also contribute to the quality and cost management of the project. Project controls systems are established during project Front-End Planning. They are then implemented and monitored throughout the life of the project, during Design, Procurement, Construction, and Startup.

The basic goal of construction project delivery is to enhance quality of product within the right duration and at the right cost, which will require amongst others a highly skilled and committed workforce.

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