An Exploratory Study on Effective Time Management of a Project

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Abstract—Scheduling and Finance plays very important role in construction projects. Lag in projects may affect the project completion and cost. To avoid such problems proper scheduling is important. It is a great challenge that the activity would be completed within the targeted duration. Scheduling is a simply a calendar with project activities, a network showing the sequence and timing of events required for a construction project. The techniques adopted for this project scheduling are namely Bar chart, Milestone chart and CPM. For the multi-storey buildings the scheduling may complex. To overcome such problems computer based scheduling software may be adopted. In this study, a real apartment building is taken as a case study. For that, scheduling is done with help of Primavera (P3) software. It is a tool for investigate the current practice of CPM scheduling. Proper monitoring of activities is another aspect that directly contributes to improve the productivity. Delays may easily identified so that necessary steps may be taken to complete the activity within duration. The scheduled duration with Primavera may compared with actual duration of the apartment building and know how completion time may differ with or without scheduling may identified.

Keywords— Construction management; Critical Path; Scheduling; Delay; *Finance;CPM; Schedule; Lag*

I. INTRODUCTION

Large scale development and prohibitive land cost in India have resulted in a vast expansion in the building is becoming essential and inevitable (i.e.) multi-storey building. Multi-storey buildings aim to increase the building area without increasing the land area. This also ensures better lighting and greater airflow as well as freedom from street noise. Unnecessary cost and delays may occur because of poor coordination and communication among the specialists. We can focus our attention on the complete process of the project management with the constructed facilities. However, it is through the understanding of the entire process of project management and in improving the productivity and quality of their work. Planning involves the listing of jobs or activities that have to be done to complete the project. The requirements of men, material, equipment, estimate of costs as also the duration of each of the activities are part of planning. Scheduling on the other hand deals with the time order in which these activities are to take place and also the manpower, materials etc., required at every stage of production. Most construction projects are schedule based on some sort of CPM technique. The project management software packages like primavera, MS project are developed to achieve a efficient Scheduling. The schedule is developed based on this premise and the resource capacity and material requirements are input for the project simulation. The importance is on project duration shortage and resource leveling. The major construction activities were developed form the Detailed construction Procedure and scheduling can be done. The CPM networks are generally used for repetitive type of projects, where fairly accurate estimates of time can be made for the activities of the project. An efficient technique helps the Construction management to control the progress of the work to achieve the original scheduled by reviewing and reprogramming under changed condition in order to adhere to the target time of completion. When planning is based on construction units (floors or apartments) fairly repetitive construction, subdivisions can be well-developed. In this case, the schedule is developed in such a way to make the same work rhythm for all the involved crew. The number of optimum crews is

select so that all crew will perform the same amount of construction units in the same period of time.

II.   SCHEDULING

The project schedule is a calendar that links the tasks to be done with the resources needed for the work. Before a project schedule can be formed, the project manager must have a Work Breakdown Structure (WBS) and an effort estimate consists of each task with resources list and their accessibility.

A. Scope

- The project schedule is the core for the project plan. It is helps the project manager to assign people to the project and define the organization how the work will be performed.
- Schedule are used to find the final deadlines and also to determine resource needs. It can be also used as a kind of checklist to make sure that every task necessary is performed.
- Control of construction duration requires a clear systematic plan and commitment on the part of the people involved in the systematic plan is known as schedule.

B. Objectives of the study

➢ To effectively monitor the time and financial management of the project.
➢ To increase the profit. and reduce the construction delays.

C. Methodology

The following "Fig.1" shows the methodology for time and cost management of the project.
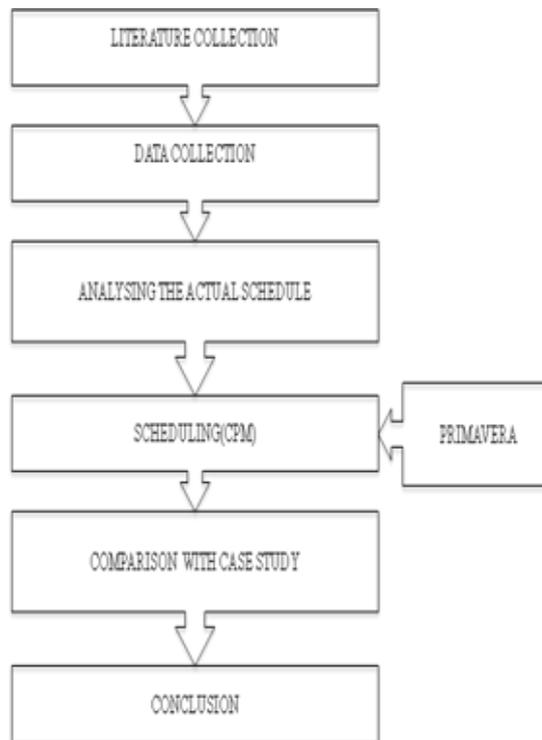

Fig. 1. Methodology of the project.

III.   SCHEDULE FOR THE CASE STUDY

In this work, a Multi storey construction project is taken as a case study. For that project scheduling is done with help of Primavera software and comparison is made between the actual schedule and schedule done using software. So that we can easily know how a proper scheduling

helps to complete the project in time.

A. Project Details

TABLE I. PROJECT DETAILS OF THE CASE STUDY

Building type	Multi storey building
Purpose	Residential
Total Area	9,600 sq.ft
Built up Area	18,000 sq.ft
No. of floors	4
Start Date	7/7/2014
Finish Date	25-10-2015

B. Scheduling procedure

The scheduling can done by using the following procedure,

- The scope of work is studied in detail from drawings and the sequence of construction including methods to be adopted and equipments to be used has been decided.
- The construction project is divided into sub projects based on the construction operation.(i.e.) Substructure and Superstructure.
- The sub projects are divided into task level in the form of Work Breakdown Structure.
- All the activities for each sub project are listed.
- Based on the construction sequences, the interdependencies between the each activity are formed.
- The time required for the completion of each activity are calculated.
- The resources such as labour, material and machinery required for each activity are estimated.
- With the help of activities and their interdependencies network has been drawn And find critical activities based on CPM method using primavera.

C. Software Introduction

Many tend to think of Primavera as helpful in large-scale projects exclusively. However, the software has been engaged in projects of any size and across every industry. The scope of Primavera is an ever-changing, ever-growing tool for make activities and tasks easier to complete.
Primavera popularity is rapidly growing for its ability to plan, manage and organize all facets of a project. Due to this popularity, many advocate sitting and practicing the use of the software. Ultimately, Primavera is like a door to a more successful future.

D. WBS of the project

The Work Break down Structure (WBS) is a task-oriented breakdown of activities for dividing a project into manageable sections using a hierarchical structure. The WBS of the apartment is shown in the "Fig. 2,".
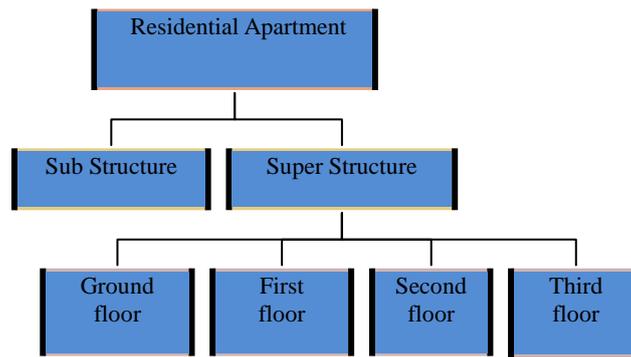
Fig. 2. WBS of the apartment.

E. Project Scheduling using Primavera

The following "Fig. 3," shows the scheduling network for the Apartment building. In this network diagram each activity and their interrelationship are shown. The critical activities are indicated in the red border box so some special care should be done while carry out this activity.

Fig. 3. Scheduling of the apartment.

IV.   COMPARISON OF ACTUAL SCHEDULE WITH SCHEDULE USING PRIMAVERA

From the below table it is clear that there is difference with actual duration of the case study and the schedule achieved using primavera.

TABLE III COMPARISON BETWEEN THE ACTUAL AND SCHEDULED DURATION.

SUB PROJECTS	ACTUAL DURATION		SCHEDULED DURATION WITH PRIMAVERA	
	START DATE	*FINISH DATE*	*START DATE*	*FINISH DATE*
1.Sub structure	07-07-2014	05-09-2014	07-07-2014	30-08-2014
2.Super structure	05-09-2014	25-10-2015	01-09-2014	24-07-2015
2.1 Ground floor	05-09-2014	22-02-2015	01-09-2014	20-01-2015
2.2 First floor	29-11-2014	29-04-2015	10-11-2014	31-03-2015
2.3 Second floor	03-02-2015	01-07-2015	21-01-2015	11-06-2015
2.4 Third floor	24-04-2015	25-10-2015	3-04-2015	24-07-2015

There is one month difference in each sub projects and overall 2 month and 29 days (i.e.) three month difference between the actual and the scheduled duration using primavera.

V.   CONCLUSIONS

In this project work, Time is managed effectively with help of scheduling using primavera and critical activities are found. By finding the critical activities, special concern should be given so that

lag may be avoid and the project may be complete as per the duration. The project can be easily cross checked if it goes as per schedule or not. The results obtained from the comparison is about 3 months difference in duration from the actual and the scheduled duration using primavera. Before the start of a particular activity, the resources (i.e. man, material and machinery) are allocated and their availability is verified so the delays due to in availability of material may be reduced. The allocation of labour is done. The allocation of materials and cost analysis using EVA (Earned Value Analysis) will be done in my future studies for estimating its completion date, final cost and analyzing variances in the schedule & budget as the project proceeds so that cost may be managed effectively.

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