SCHEDULING AND FINANCIAL ANALYSIS OF A MULTISTOREY OFFICE BUILDING BY USING MS PROJECT

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Abstract—*Construction scheduling and financial analysis is a complex process involving the design process, activity sequencing, resource allocation, timing and cost variance. 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 interacting among the different works tasks, estimating the amount of the individual work tasks and analysis of cost variance of individual tasks and the total work. A good construction scheduling is the basis of any project to complete it in given the time, project scheduling is intended to match the resources with project work tasks over time.*

Keywords—*activity sequencing;resource allocation; timing; cost variance; scheduling; estimation;financial analysis*

I. INTRODUCTION

Multi-storeybuildings aim to increase the area of the building without increasing the area of the land the building is built on, hence saving land and, in most cases, money(depending on material used and land prices in the area, of course). Large scale industrialization and prohibitive land cost in India have resulted in a vast expansion in the building programme stages has reached when multi-storyed construction is becoming essential and inevitable. A common concept of multi-storey building in India is a building having over five or six stories. This kind of buildings are under construction in the metropolitan cities like Calcutta, Delhi, Chennai, etc.,

Following are the objectives of Thesis

- Scheduling the project with men, material and money as constraints.

- To budget the cost of construction and contribution.

- To monitor at regular intervals, the present/projected status of the job and identify the variances.

- To initiate the corrective action wherever necessary.

- To know the performance of project cost &time at any time.

II. METHODOLOGY
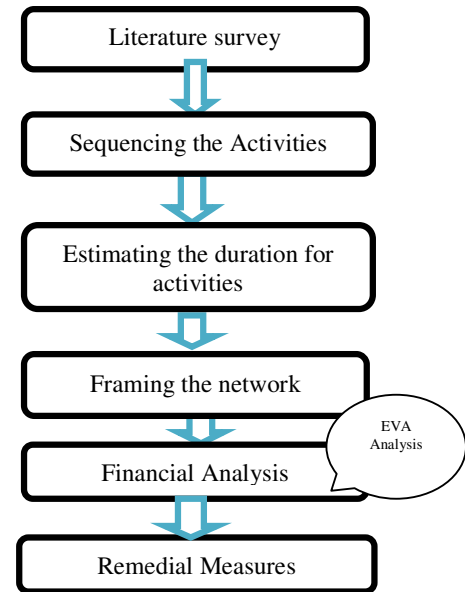
III. SCHEDULING

The project schedule is a calendar that links the tasks to be done with the resources that will do them. Before a project schedule can be created, the project manager must have a Work Breakdown Structure (WBS), an effort estimate for each task, and a resources list with availability for each resource.

It is a graphical representation which shows the phasing rate of construction activities with the starting and completion dates and sequential relationship among the various activities or operations in a project so that work can be carried out in an orderly and effective manner.

A. Traditional Scheduling Techniques

1. Bar chart method.
2. Mile stone method.
3. Linear scheduling method.

All these techniques are non-network based.

B. Non Traditional Scheduling Techniques

1. Critical Path Method (CPM)
2. Program Evaluation and Review Technique (PERT)
3. Precedence Diagramming Method (PDM)

All these techniques are network based, so one can say that modern techniques are network based while traditional are non-network based scheduling techniques.

(a)CPM Network Analysis

CPM scheduling is a good tool. Scheduling plays an important role in financial proposal and budgeting. The schedule is prepared by the scheduler and/or planner may meet or discuss with some people for crucial information, e.g. Estimator, Manager, Superintendent, Sub-Contractor, Architect, Engineer, Owner, and Material's Suppliers. They may need to study the contract, drawings, specification and perhaps, conduct site reconnaissance. Further, they need to know about manpower and productivity. Apart from the schedule, it is also necessary to prepare systematic monitoring to provide early warning of restraints as well as imaginative action to overcome them.

(b)Program Evaluation And Review Technique(PERT)

PERT (or) Program Evaluation and Review Techniques is a management tool used for planning, controlling and reviewing a project. It developed by the U.S Navy along with a management consultancy firm for its Polaris missile program.

An important characteristic of any project is its duration. The effectiveness and economy of the project is often dependent on the project duration. The total project duration depends on the time taken for each event to occur. To estimate the time required for each event to occur, it requires the planner to have a wide experience, with similar project.

IV. MS PROJECT

Micro Soft Project (MSP) is a project management software programme developed and sold by Microsoft which is designed to assist project managers in developing plants, assigning resources to tasks, tracking progress, managing budgets and analyzing workloads.

Typical work activities include:

- Selecting the appropriate techniques and sequence of events for a particular project.
- Presenting schedules of work, often with visual aids as bar charts and procedures diagrams.
- Monitoring progress throughout the construction process and comparing this with the projected schedule of work.

SCHEDULE FOR THE PROJECT-STRUCTURAL ACTIVITY
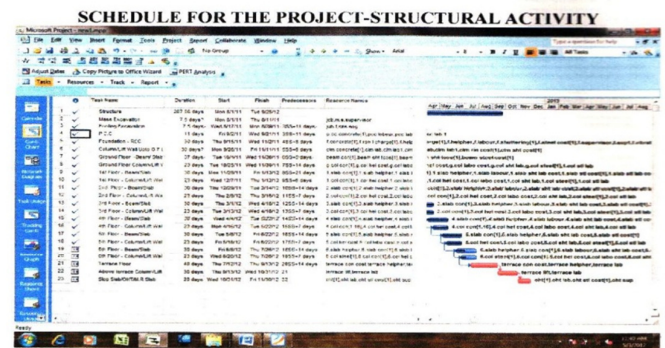
SCHEDULE FOR THE PROJECT-FINISHING ACTIVITY

V. FINANCIAL ANALYSIS

Earned Value Analysis (EVA) is an industry standard method of measuring a project's progress at any given point of time, forecasting its completion date and final cost, and analyzing variances in the schedule and budget as project proceeds.

Cost Variance (CV) = EV - AC
Schedule Variance (SV) = EV – PV
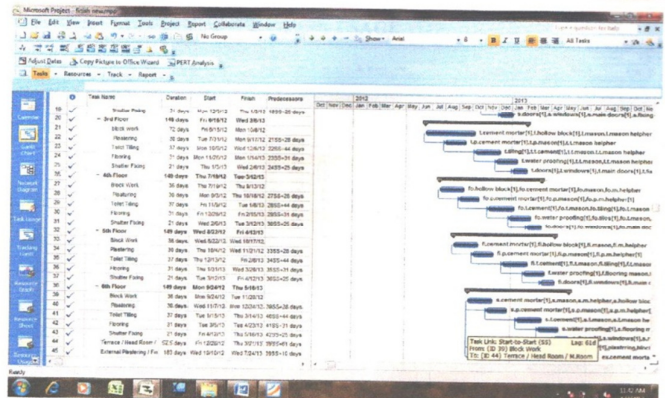
The most commonly used cost-efficiency indicator is the cost performance index (CPI). It is calculated thus:
CPI = EV / AC
The schedule performance index (SPI), calculated thus:
SPI = EV / PV

COST REPORT FOR STRUCTURAL ACTIVITY

VI. RESULT AND DISCUSSION

PROJECT DETAILS

1) Name of the project : OFFICE BUILDING
2) Name of the company: DEEPAM INFRASTRUCTURE
3) Total area of construction : 15050 sq.ft
4) Total saleable area : 21500 sq.ft
5) Grand total cost of construction: Rs. 14,13,04,361
6) NO. of floors : 7
7) Rate/sq.ft : Rs. 5500.00

BUDGET OF THE PROJECT

The cost incurred to complete the project is estimated as follows

SI.NO	DESCRIPTION	TOTAL COST	
1.	Excavation	Rs	10,42,000.00

2.	Anti Termite Treatment	Rs	58,120.00
3.	Concrete	Rs	4,26,05,600.00
4.	Reinforcement Steel	Rs	3,89,83,565.00
5.	Brick layer	Rs	1,63,20,787.00
6.	Joinery	Rs	66,40,874.00
7.	Water Proofer	Rs	12,42,980.00
8.	Plaster	Rs	1,29,08,145.00
9.	Painter & Decorator	Rs	61,59,650.00
10.	Stairs & Railing	Rs	28,22,650.00
11.	Over Head Tank (1 nos)	Rs	15,15,360.00
12.	Finishes	Rs	69,71,402.00
	GRAND TOTAL	Rs	13,72,71,133.00

QUANTITY OF THE ACTIVITY

- Total Site Area = 2000 m^2
- Total Building Area = 1400 m^2 Foundation
- Total Footing Excavation = 1438 m^3
- Total P.C.C Quantity = 64m^3
  - Total Footing Concrete = 2454 m^3
  - Total Footing Reinforcement = 23163 kg
  - Total Pedestal Reinforcement = 2699 kg
  - Total Pedestal Concrete = 91 m^3
  - Total ground Slab = 140 m^3

ACTIVITY	GF	1ST FLOOR	2ND FLOOR	3RD FLOOR	4TH FLOOR	5TH FLOOR	6TH FLOOR	TERRACE
Total column concrete(m^3)	98	98	98	98	98	88	88	79
Total column concrete(kg)	4553	4432	4002	3683	3376	2989	2558	2336
Total slab concreting(m^3)	1420	1350	1290	1150	1150	1150	1080	980
Total slab reinforcement (kg)	15750	14875	14056	13776	13776	11576	9877	9559
Total shuttering(m^2)	22487	22487	20487	19776	19776	18892	18578	18412

ECONOMY IN CONSTRUCTION COST

Cost for Masonry

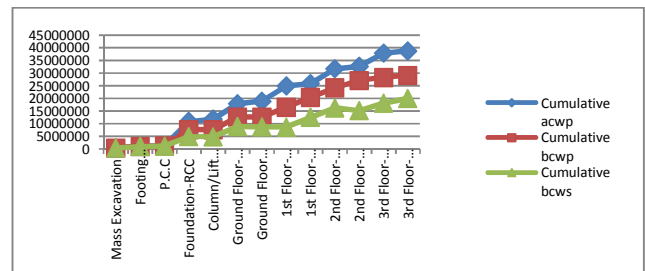| Type of material		Amount in Rs
Full masonry	Solid wall	58,18,750.00
	Hollow block (200 mm thk)	51,42,937.00
Half brick masonry	Solid wall	26,20,800.00
	Hollow block (100 mm thk)	27,38,300.00
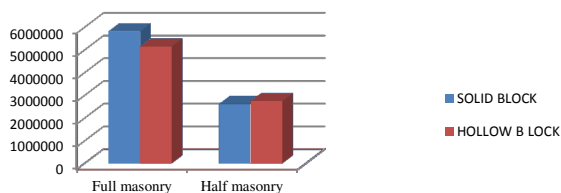
Cost for concrete

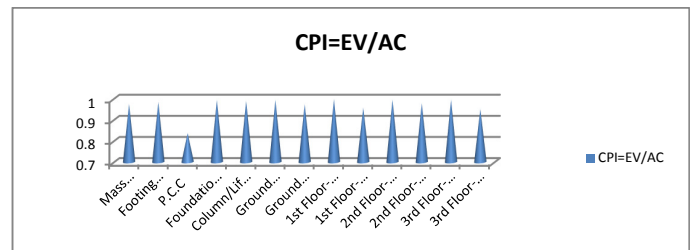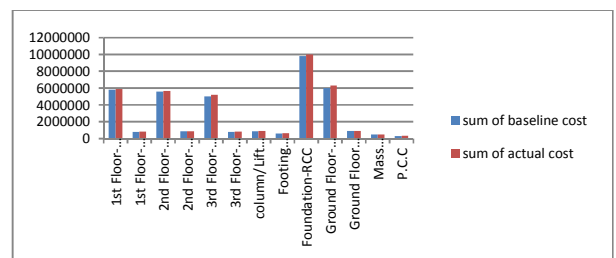| Type of material		Amount in Rs
Concrete	RMC	3,82,44,578.00
	SMC	43,61,022.00
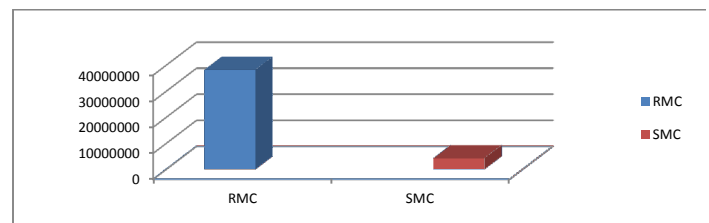
Cost status report
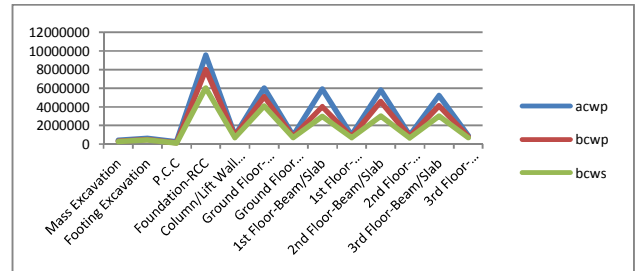
Cumulative cost status report

Cost performance Index Report

CPI=EV/AC

Base line cost report
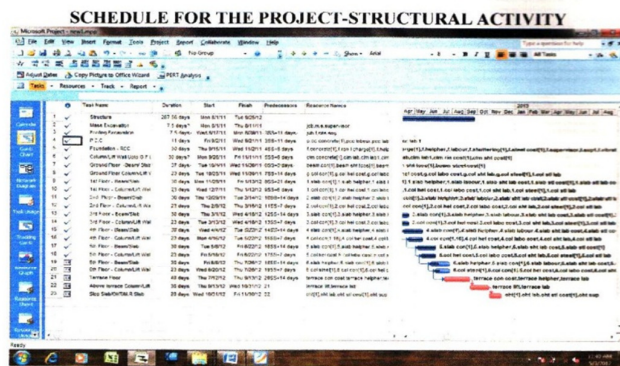

VII. REMEDIAL MEASURES

Following are the some of the remedial measures to control the cost variances which occur in the projects.

- Cost and Schedule monitoring should done at regular interval.
- After identifying the variances, immediately apply necessary corrective action.
- Reduce the overall cost by selecting appropriate material.
- A good database should maintain for monitoring Cost and Schedule performance.

- The construction material should buy at cheaper rate than the standard rate.
- Provides a pathway to take decision regarding future performance of the project.
- Finishing activities is done simultaneously with the structural activity, it will helps to increase the work progress.

VIII. CONCLUSION

1. After complete the schedule and Financial analysis of the building it has been observed that there is more difference between budget cost and actual cost.
2. The cost difference is due to the huge increase in the material's price and the labor's wages.
3. In this thesis an attempt is made to assess the cost performance of the project by monitoring the cost progress.
4. To have clear idea about the status of the project, it helps to incorporate mandatory changes and record effects in budget and schedule.
5. In this thesis, a huge cost variances is measured by EVA analysis to overcome these cost variances, the remedial measures which will given by this thesis should be followed.

SCHEDULE FOR THE PROJECT-STRUCTURAL ACTIVITY

SCHEDULE FOR THE PROJECT-FINISHING ACTIVITY

ACKNOWLEDGMENT (HEADING 5)

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