

# Estimation and Scheduling on Activities in Construction Building using Novel Software

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## Abstract

*This research paper proposes the analysis of scheduling and financial by using MSP Software is a process which involves estimation, sequencing the activities, resources allocation and timing. The construction scheduling is to complete the project in time and match the resources with the allocated time. Scheduling using MSP Software gives good controlling and clear schedule to a project. EV analysis may be an standard system for measuring a project's advancement at whatever provided for side of the point from completion time, determining its fruition date, final cost furthermore examination difference in the plan and plan of the undertaking. This project deals with scheduling using MSP and EV Analysis for a apartment building. Thereby process time and cost overrun are avoided.*

**Keywords:** MSP Software, EV analysis

## 1. Introduction

Multi-storey buildings 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-storey construction is becoming essential and inevitable.[1] Land use economy is achieved by construction of multi-storey buildings which results in large building more concentrated on relatively small built up area. This makes available a large proportion of open space for creating natural environments.[2]. Many authors sought to research the effect of GO and TiO<sub>2</sub> nanoparticles on efficiency, of the construction of buildings structures.[3]

This also ensures better day-lighting and greater airflow as well as well as freedom from street noise. Living and working in such buildings provide panoramic view of the city. One production scheduling and control technique which tries to surpass. The CPM difficulties for multi-storey building scheduling are the Line of Balance (LOB) technique.[4] Materials were characterized for nanostructure and morphology of the nanocomposites GO, TiO<sub>2</sub>, GO<sub>2</sub>-TiO<sub>2</sub> to demonstrate the shape of the nanoparticles.[5]

The LOB technique was developed in the early 40's into the manufacturing environment and adapted by researchers for using on construction industry in the close as possible to the original scheduled by reviewing and reprogramming under changed condition in order to adhere to the target time of completion.[6-7]

A specially built sample package, comprising a glass microfiber filter paper supported on a mild steel wire frame, was obtained from the samples.[8]

## **2. Scheduling & Financial Analysis**

The schedule of project will be calendar which connects the assignments which need to be done through resources which would do for them. And before creating the schedule of the project, the manager of the project should possess the “Work Breakdown Structure (WBS)”, effort predicted aimed at every assignment, and list of resources with accessibility aimed at every resource.

### **2.1 Scope**

The time of manager of project is finely spent on the team working to form WBS & predicts than efforting to construct schedule of project without them. And the schedule of project will be core of project design. It will be utilized through the manager of project for committing the people towards project & display the administration how the task is executed.

Schedules are utilized for interacting last deadlines & in some instances for evaluating the requirements of resource. And they are utilized checklist type to assure that each assignment required is executed. When the assignment will be on schedule then the team will be committed for doing that. In the other terms, the schedule of the project will be by means of through which the manager of project gets team & project beneath his control.

#### **A. Purpose of Scheduling**

- a) Plan is reflected by schedule, yet plan should be first.
- b) It will be the definition of ordering of performance and timing in project & assembly to specified entire time for completion.
- c) The scheduling procedure might uncover the plan faults, resulting to plan revisions.

#### **MSP Project**

Microsoft venture MSP may be an undertaking management programming developed and more sold by Microsoft which is outlined to support project supervisors to Creating plans, appointing assets with tasks, following progress, managing financial budgets and dissecting workloads.

The engineer of planning improves the most suitable model and ordering of building operations aimed at specified project, at the combination with manager of site. They design & oversee the whole programme of the work & should predict the demands of contracts in words of material, technical issues, labour and equipment. And also guaranteeing that building will be completed at safety towards maximum technical benchmark, the engineer for planning also responsible aimed at specifying the contract duration. This will be important responsibility if penalty clauses aimed at late finishing are on paper into contracts of project.

Traditional activities of work contain:

- Choosing the suitable methods and ordering of the events aimed at specified project.
- Depicting the work schedules often through “visual aids” as diagrams of process & bar

charts.

- The progress should be observed all over the procedure of construction & comparing this through projected work schedule.

#### D. Financial Analysis EVA Analysis

“Earned Value Analysis (EVA)” will be an industry benchmark model of evaluating the progress of project at any specified time, predicting its finishing cost and date, and evaluating changes in budget & schedule according to the proceedings of project. When compares the designed quantity of work through what was really been finished, to evaluate the price, accomplishment of work and schedule according to design. As the work is finished, it will be deliberated “earned”.

##### 1) Calculating Earning Value

Earned Value Management measures progress against a baseline. It involves calculating three key values for each activity in the WBS:

- a) The Planned Value (PV), (formerly known as the budgeted cost of work scheduled or BCWS)
- b) The Actual Cost (AC), (formerly known as the actual cost of work performed or ACWP)
- c) The Earned Value (EV), (formerly known as the budget cost of work performed or BCWP)

These 3 values are joined for evaluating during time whether the work is accomplished according to design. The major generally utilized measures are variance of price:

$$\text{Cost Variance (CV)} = \text{EV} - \text{AC} \quad \text{Schedule Variance (SV)} = \text{EV} - \text{PV}$$

These 2 values is converted to effective indicators for reflecting cost & scheduling the project execution. The major generally utilized indicator of “cost-efficiency” will be the “cost performance index (CPI)”. It will be computed as:

$$\text{CPI} = \text{EV} / \text{AC}$$

The aggregate of entire unique “EV budgets divided by the sum of all individual AC's is known as the cumulative CPI”, and will be commonly utilized to predict the complete project worth.

The “schedule performance index (SPI)”, computed thus:

$$\text{SPI} = \text{EV} / \text{PV}$$

is generally utilized through “CPI to forecast overall project completion estimates”.

A “negative schedule variance (SV)” computed at specified time as project will be scheduled behind, whereas “negative cost variance (CV)” means “project is over budget”.

### 3. Result and Discussion

#### a. Project Details

- 1) Project name : RESIDENTIALBUILDING
- 2) Entire region for Construction : 15050sq.ft
- 3) Entire Saleable region : 21,500sq.ft
- 4) “Grand total cost Construction” : Rs 10, 00, 00,000/
- 5) Count of floors : 6
- 6) “Rate/sft” : Rs5000/

**b. Project budget**

The incurred cost for finishing project will be predicted in the following way:

**1) Grand Total:**

Table I project budget cost

Sl.N O	Description	Total cost	
1)	Building works	Rs	9,36,16,772
2)	External development works	Rs	25,58,846
3)	Architectural Features	RS	38,24,382
	<b>Grand Total</b>	Rs	10,00,00,000
	Total building area		15,050sq.ft
	Rate/sft	Rs	1993.35

**c. Quantity of the Activity**

**1) Quantity of the foundation activity**

- Entire Area of Site =2000m<sup>2</sup>
- Entire Building Area =1400m<sup>2</sup>
- Entire Footing Excavation =438m<sup>3</sup>
- Entire P.C.C Quantity =64m<sup>3</sup>
- Entire Footing Concrete =2454m<sup>3</sup>
- Entire Footing Reinforcement =23163kg
- Entire Pedestal Reinforcement =2699kg
- Entire Concrete Pedestal = 91m<sup>3</sup>
- Entire ground slab =140m<sup>3</sup>

**3)First floor to fifth floor**

- Entire concrete column =50m<sup>3</sup>.
- Entire reinforcement of column =4002kg.
- Entire concreting of slab =1356m<sup>3</sup>.
- Entire slab Reinforcement =14576kg.
- Entire shuttering =20487m<sup>2</sup>

**4) Sixth floor**

- Entire column concrete =35m<sup>3</sup>.
- Entire reinforcement column =2654kg.
- Entire concreting of slab =1267m<sup>3</sup>.
- Entire reinforcement of slab =10356kg.
- Entire shuttering =13243m<sup>2</sup>.

**d. Economy in Construction Cost**

The construction should be done as economically as possible by organizing labour, materials, transport, supervision, etc., a well organized work cost less. All design and working drawings should be prepared in advance, requirement of materials should be worked out and materials should be organized, collected and stocked close to the site of work well in advance so that work is not held up for want of materials. The whole construction shall be completed as quickly as possible so that the supervision cost may be minimum possible Over-head costs should be kept as low as possible

**1) Concrete:**

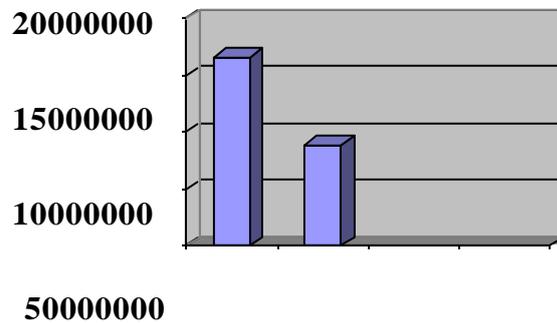
Concrete is a homogeneous mix of cement, coarse aggregate, fine aggregate and water. The concrete members will transfer the load from the building to the soil. Concrete can be prepared by two means Ready mix concrete (RMS) and Standard mixing concrete (SMC). The SMC is cheaper when compared with RMC. But the RMC will reduce the time and it will provide a uniform homogenous mix

**2) Ground floor**

- Entire column concrete =53m<sup>3</sup>.
- Entire column Reinforcement =4553kg.
- Entire slab Concreting =1540m<sup>3</sup>.
- Entire slab Reinforcement =15750kg.
- Entire shuttering =22487m<sup>2</sup>

Table Ii Cost for Concrete

Type of material		Amount in Rs
concrete	RMC	1,65,82,160/
	SMC	88,93,980/



**RMC SMC**

Fig 1 Cost Comparison for Concrete

**e. Scheduling Of the Structural Activities**

Table Iii Schedule of The Structural Activity

si.no	Tasks	Duration	Predecessors
1	Mass Excavation	8 days	-
2	Footing Excavation	8 days	2SS+11 days
3	P.C.C	11 days	3SS+11 days
4	Foundation - RCC	30 days	4SS+8 days
5	Column/Lift Wall Upto G.F LVL	30 days	5SS+6 days
6	Ground Floor - Beam/ Slab	37 days	6SS+5 days
7	Ground Floor Column/Lift Wall	23 days	7SS+14 days
8	1st Floor - Beam/Slab	30 days	8SS+21 days
9	1st Floor - Column/Lift Wall	23 days	9SS+6 days

10	2nd Floor - Beam/Slab	30 days	10SS+14 days
11	2nd Floor - Column/Lift Wall	23 days	11SS+7 days
12	3rd Floor - Beam/Slab	30 days	12SS+14 days
13	3rd Floor - Column/Lift Wall	23 days	13SS+7 days
14	4th Floor - Beam/Slab	30 days	14SS+14 days
15	4th Floor - Column/Lift Wall	23 days	15SS+7 days
16	5th Floor - Beam/Slab	30 days	16SS+14 days
17	5th Floor - Column/Lift Wall	23 days	17SS+7 days
18	6th Floor - Beam/Slab	30 days	18SS+14 days

**f. Base Line Cost Report**

This report shows the budget, baseline and actual cost of the structural activities, in this chart two bar present in the cost. The bar represent the budget cost up to the baseline .The second bar shows remaining period of the budget cost.

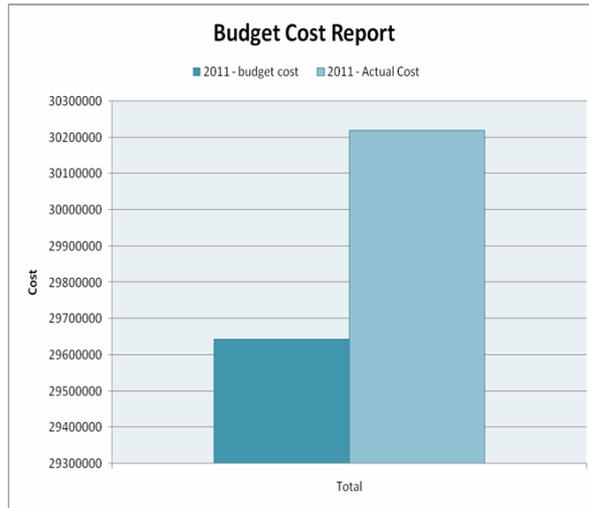


Fig 2:Base Line Cost Report

**g. Cash Flow Report**

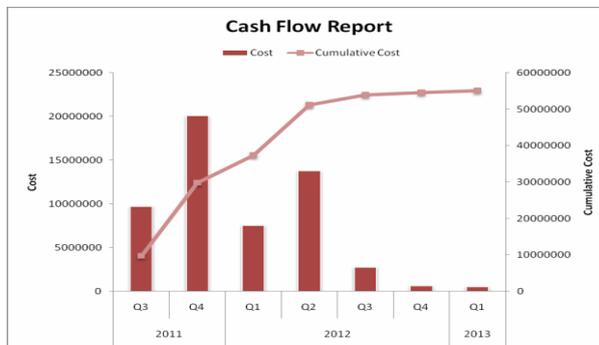


Fig 3:Cash Flow Report

The above report shows how much amount spent in quarterly period of year in the project. Two type of cost represent in the chart.

1. Budget cost
2. Cumulative cost

The sum of the budget cost is known as cumulative cost.

**h. Earned Value Analysis of the Structural Activity**

Task	Actual	Earnedval	Cost

<b>s no</b>	<b>cost AC in Rs/-</b>	<b>ue EV in Rs/-</b>	<b>variance (AC-EV) in Rs/-</b>
1	33,000.00	30,600.00	2,400.00
2	42,000.00	32,000.00	10,000.00
3	2,20,000.00	2,01,000.00	19,000.00
4	89,31,576.00	88,31,576.0 0	100000.00
5	5,80,900.00	5,60,900.00	20,000.00
6	57,65,678.00	59,90,750.0 0	2,25,072.00
7	24,30,524.00	24,20,216.0 0	10,308.00
8	59,11,850.00	59,09,936.0 0	1,914.00
9	9,21,436.00	9,20,416.00	1,020.00

Table.4. EV Analysis of activity

#### 4. Conclusion

After complete the schedule and financial analysis of the building it has been observed that lot of differentiates between budget and cost, cost varies is due to increases the materials cost and labor wages, for construction also delaying more due to natural disturbance occurs

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