

Planning and Scheduling of College Building by using Primavera P6

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Abstract - For Successful Completion of Project, Planning and Scheduling are two most important factors. Due to the increase in Workloads and Shrinking resources Construction Work Department Found New Technology Which helps to Manage the Project easily. With the help of Primavera P6 Software proper planning and scheduling can be done. Primavera can easily compare between the planned progress of construction work and actual progress of construction project. In this study, G+5 college Building Plan is drafted in AutoCAD and estimate the building material quantity and scheduling and controlling the project by primavera p6.

Keywords - Planning, Scheduling, Primavera p6

1. INTRODUCTION

A project is composed of jobs, activities, functions or tasks that are related one to the other in some manner, and all of these should be completed in one order to complete the project. Project management involves three phases: project planning, project scheduling, project controlling. For the completion of project to basic things are material resources and manpower resources. The basic element of project network is event and activity. The commencement or completion of an activity is called an event. An activity is the actual performance of the task. Oracle primavera p6 is also known as EPPM which is abbreviated as enterprise project portfolio management. It is also the most powerful strong and easy handling software and used solution for worldwide, Organizing, planning, managing, and execute project, programs and portfolios. Primavera P6 software helps to achieve the maximum return on investments in project and progress. Primavera P6 gives a single solution for multi projects of any size. Primavera can handle the projects of large size according the persons need.

2. LITERATURE REVIEW:

[1]“Planning, Analysis & Construction Controlling of G+5 Building by Using Primavera.”

The main objective of this project is to analyses and to construction scheduling of an apartment building (G+5) using STAAD Pro and Primavera P6 software. First of all, the planning is done using Auto CAD and code refered for this project is IS 456-2000. The first and foremost thing which we can get by effectively planning in primavera is start date on 01 July 2019 and finishing date of 27 Dec 2022 project. Primavera P6 helps in effectively scheduling the project by assigning two relationships at a time to each activity and considerably reduces the float. All the important steps like creating an EPS, creating a WBS, linking of activities

according to their interdependence and availability of resources and determination of critical path are clearly exhibited in this report. Budgeted cost, time, and materials of the project are obtained by resource allocation.

[2] “Project Management of in Construction using primavera” (August 2017)

For the successful completion of a project, planning and scheduling are two most important factors. The demand of construction industry requires a precise planning, scheduling and management which can allow the overall optimization of the cost, time and resources. Due to the increase in workloads and shrinking resources public work department found new technology which helps to manage the project easily. Project management software is used as a tool for managing and organizing work which helps industries to grow in a rapid manner. There are so many computers software are available in market now a days which is such as MSP, Primavera p6, etc..for doing project management. With the help for this software proper planning and controlling of project can be done. Primavera can easily compare between the planned progresses of construction work and actual progress of Construction project. Project management software Primavera P6, include collecting, recording, monitoring, controlling and reporting information concerning project perform.

[3] “Planning and Scheduling of High-Rise Building Using Primavera” (June 2014)

Although the long-introduced Industrialized Building System (IBS) has promised to solve and improve the current construction method and scenario in our country, but the IBS method has not gained enough popularity. One of the reasons is due to lack of research works done to quantifying the benefit of IBS especially in construction time saving. In lieu with such scenario, this study conducted to quantify evidence of time saving in IBS application. The methodology adopted for this study is by modelling the construction process for high-rise residential building for both conventional and IBS with shared more a less the same nature and size of the structure. The model was developed using Primavera(P3) project planning software. The comparison was made by comparing selective building components for both method of construction. Different high-rise residential projects have been selected for this study. The result of the study clearly indicated that sufficient time saving can be archived.

3. OBJECTIVE OF WORK

i. For planning and scheduling of the construction of

college building.

ii. To control the project time.

iii. For creating strategies, controlled the delay of the project

4. METHODOLOGY

- a. Auto cad planning and drafting
- b. Estimation using excel sheet
- c. Planning and scheduling using primavera p6.

4.1 Case Study

The project site that was taken for our project is in Bangalore. With the help of plans and other structural drawings the estimation work was carried out.

Salient Features of the project

Sl.no	Name Of the Work	Construction of college Building Bangalore
1	NO Of Floors	Basement, G+5
2a	Basement	1768.00 sqm.
2b	Ground Floor	1768.00 sqm
2c	GroundFloor to Fifth floor	1768.00 sqm. (Each floor)
3a	Basement provided	Laboratory, store room, open area Principal room, chairman room, Board room, library etc.
3b	Ground floor	Principal room, chairman room, Board room, library etc.
3c	First floor to fifth floor	Basic-science Department, Civil department, CSE Department, ISE Department, Auditorium
4	Staircase	1-no's
5	Lifts	1-no's

Table -1

4.2 Planning By Using Auto CAD

CAD drawings means detailed and accurate computer-aided design drawings to illustrate the design.

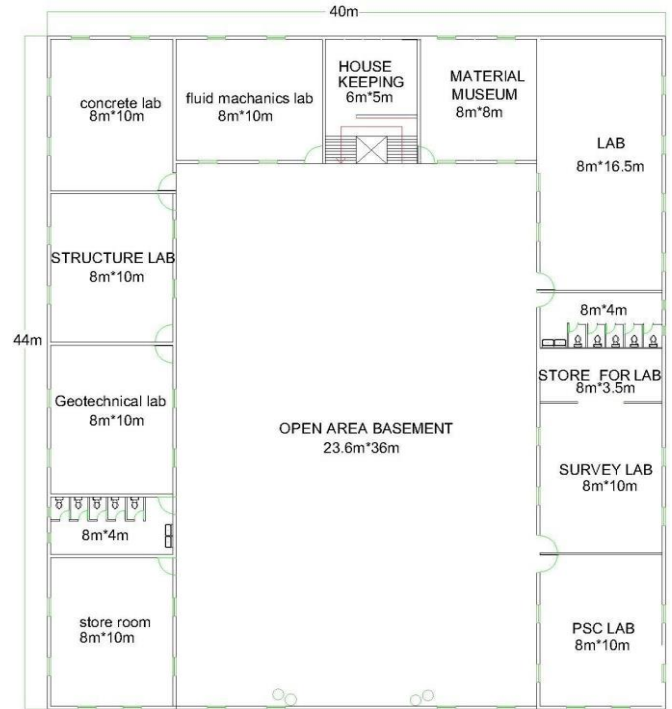


Fig:1(a)-Basement

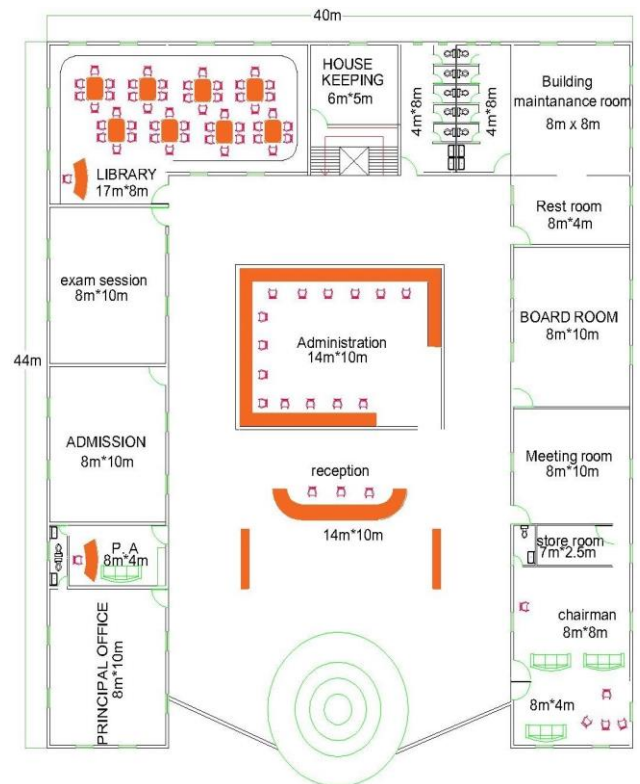


Fig :1(b)-Ground Floor

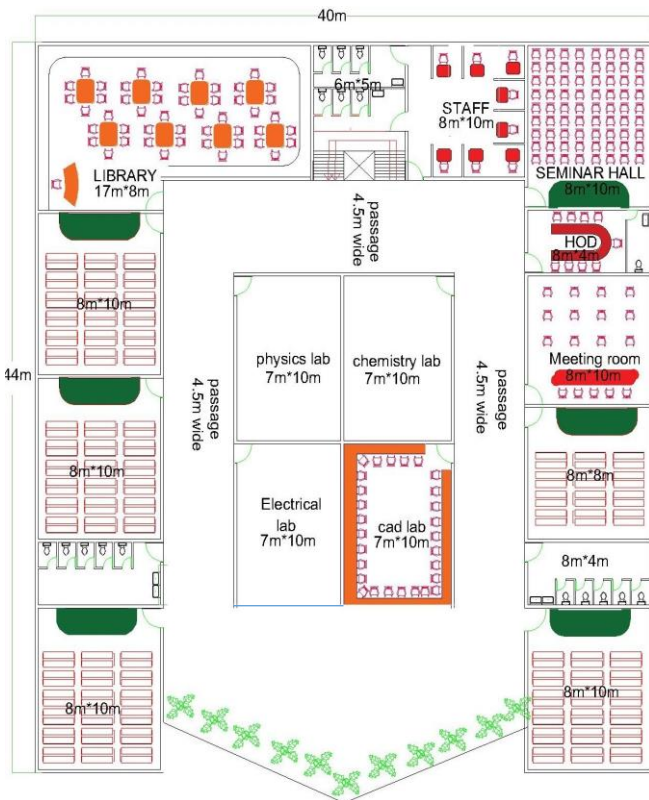


Fig:1(c)-First Floor(Basic Science Department)

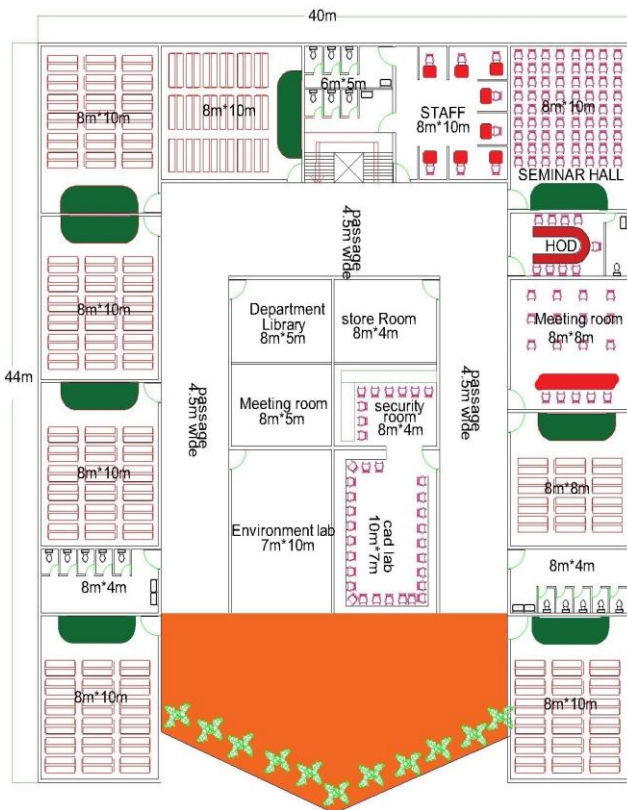


Fig :1(d)-Second Floor (Civil Department)

❖ ESTIMATION:

Estimation is the scientific way of working out the approximate cost of an engineering project before execution of the work. We have done the estimation to take take off quantities of structural elements using Microsoft Excel.

❖ Steps involve in controlling and monitoring

i. Creating EPS:

The project contains a set of different activities and associated information that constitutes a plan for creating a product or service. The project is created under respective divisions in EPS.

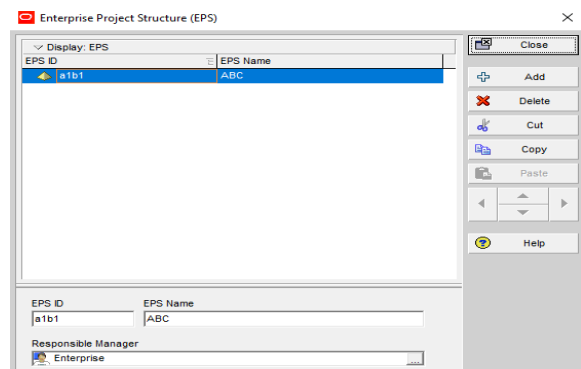


Fig:2(a)- Creating EPS

ii) Creating project:

The project contains a set of different activities and a s s o c i a t e d information that constitutes a plan for creating a product or service. The project is created under respective divisions in EPS.

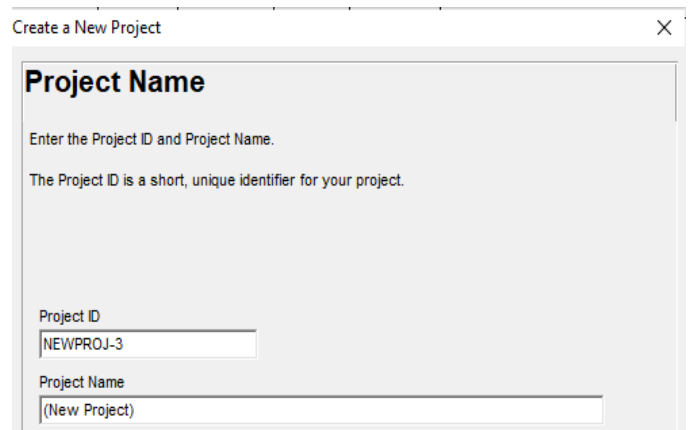


Fig:2(b) -Creating New Project

iii) Creating calendar:

Calendars enable you to define available workdays and work hours in a day.

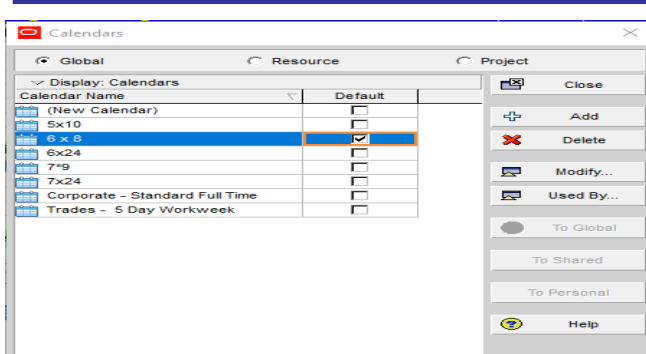


Fig:2(c)- Creating Calendar

iv) Work breakdown structure:

WBS elements have defined and organize the project elements.

WBS Code	WBS Name	Total Activities
727997	college Building	48
727997.6	Preconstructions	7
727997.1	initiation	5
727997.2	substructure	6
727997.7	Basement	0
727997.3	structure	4
727997.8	ground floor	4
727997.8.1	structure	4
727997.4	mep (basement and ground floor)	8
727997.5	finishing (basement)	6
727997.9	finishing (ground floor)	6
727997.10	Infrastructure	2

Fig:2(d)- Work breakdown structure

v) Defining activity

Activities are the basic work elements of a project.

Activity ID	Activity Name	Start	Finish	Original Duration	Quantity
727997	college Building	05-Sep-21	01-Mar-22	269	0.00
727997.6	Preconstructions	05-Sep-21	31-Mar-22	101	0.00
A1420	Project start	05-Sep-21	06-Sep-21	1	
A1430	Basic survey	07-Sep-21	15-Sep-21	7	
A1430	Soil investigation	07-Sep-21	15-Sep-21	7	
A1440	Architecture Design	06-Sep-21	06-Jan-22	90	
A1450	Structural Design	07-Jan-22	17-Feb-22	30	
A1460	Map Design	18-Feb-22	31-Mar-22	30	
A1470	Allocation of contract	18-Feb-22	31-Mar-22	30	
727997.1	initiation	01-Apr-22	19-Apr-22	13	0.00
A1010	machinery mobilization	01-Apr-22	11-Apr-22	7	
A1030	site boundary fixation	01-Apr-22	05-Apr-22	3	
A1030	temporary connectio of electrical	06-Apr-22	11-Apr-22	4	
A1250	Engineering office and labour	12-Apr-22	14-Apr-22	3	
A1260	Survey work for constructions	15-Apr-22	19-Apr-22	3	
727997.2	substructure	20-Apr-22	18-May-22	21	0.00
A1060	marking	20-Apr-22	22-Apr-22	3	
A1060	excavation	22-Apr-22	27-Apr-22	4	
A1060	foundation	28-Apr-22	06-May-22	7	
A1070	sm	08-May-22	17-May-22	7	
A1080	backfilling	12-May-22	16-May-22	3	
A1280	dpc	17-May-22	18-May-22	2	
727997.7	Basement			0	0.00

Fig:2(e)- DefiningActivity

vi) Gantt chart

A graphic display of schedule related information listing project elements on left side of the chart. Date across the top and activity duration are shown as date placed horizontal bars. It is also known as Bar Chart.

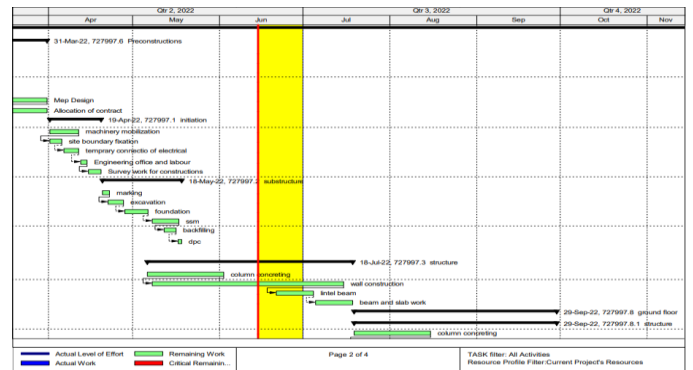


Fig:2(f)- Gantt chart

vii) Units of measures:

User-Defined Fields (UDF's) enable you to add an unlimited number of custom fields and values to the project database. Resource UDFs enable you to create a custom unit of measure, so you can track critical items.

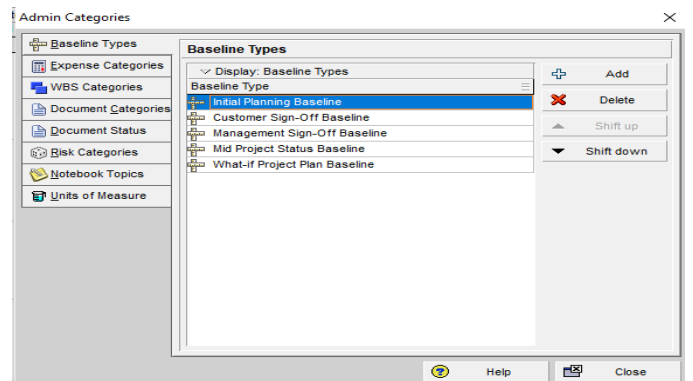


Fig :2(g) -Units of Measure

❖ Scheduling in primavera p6

Scheduling of activities for basement and ground floor.

Activity ID	Activity Name	Start	Finish	Original Duration
727997	college Building	05-Sep-21	01-Mar-22	269
727997.6	Preconstructions	05-Sep-21	31-Mar-22	101
A1420	Project start	05-Sep-21	06-Sep-21	1
A1430	Basic survey	07-Sep-21	15-Sep-21	7
A1430	Soil investigation	07-Sep-21	15-Sep-21	7
A1440	Architecture Design	06-Sep-21	06-Jan-22	90
A1450	Structural Design	07-Jan-22	17-Feb-22	30
A1460	Map Design	18-Feb-22	31-Mar-22	30
A1470	Allocation of contract	18-Feb-22	31-Mar-22	30
727997.1	initiation	01-Apr-22	19-Apr-22	13
A1010	machinery mobilization	01-Apr-22	11-Apr-22	7
A1030	site boundary fixation	01-Apr-22	05-Apr-22	3
A1030	temporary connectio of electrical	06-Apr-22	11-Apr-22	4
A1250	Engineering office and labour	12-Apr-22	14-Apr-22	3
A1260	Survey work for constructions	15-Apr-22	19-Apr-22	3
727997.2	substructure	20-Apr-22	18-May-22	21
A1060	marking	20-Apr-22	22-Apr-22	3
A1060	excavation	22-Apr-22	27-Apr-22	4
A1060	foundation	28-Apr-22	06-May-22	7
A1070	sm	08-May-22	17-May-22	7
A1080	backfilling	12-May-22	16-May-22	3
A1280	dpc	17-May-22	18-May-22	2
727997.7	Basement			0
A1090	column concreting	06-May-22	02-Jun-22	20
A1100	wall construction	08-May-22	15-Jul-22	50
A1110	initial beam	21-Jun-22	04-Jul-22	10
A1290	beam and slab work	08-Jul-22	18-Jul-22	10
727997.8	ground floor			14
A1120	column concreting	18-Jul-22	26-Sep-22	54
727997.8.1	structure			20
A1130	column concreting	19-Jul-22	15-Aug-22	20

Fig:2(h)- Activities and dates

❖ RESULTS

The results we got from estimation are- Estimation of quantity (for basement and ground floor).

Table -2

Sl.no	Particulars	Quantity	units
1	Excavation	6451.59	m3
2	Footing	468.64	m3
3	Column up to plinth	27.89	m3
4	Plinth Beam	93.68	m3
5	Footing steel	58.58	tonne

Basement Floor

Table-3

Sl.no	Particulars	Quantity	units
1	column	79.68	m3
2	Beam	93.68	m3
3	Slab	352	m3
4	Column steel	8.07	tonne
5	Beam steel	14.05	tonne
6	Slab steel	44	tonne
7	Stair case	3.78	m3
8	Stair case steel	0.47	tonne
9	Wall	175.28	m3
10	Plastering	2191.2	m2
11	Painting	2191.2	m2
12	Cladding	82.80	m2
Wooden work			
13	Main Door	12	No
	Door(Toilet)	10	No
	Ventilation	4	No
16	Windows	40	No

Ground Floor

Sl.no	Particulars	Quantity	units
1	column	79.68	m3
2	Beam	93.68	m3
3	Slab	352	m3
4	Column steel	8.07	tonne
5	Beam steel	14.05	tonne
6	Slab steel	44	tone
7	Stair case	3.78	m3
8	Stair case steel	0.47	tone
9	Wall	214.34	m3
10	Plastering	2489.6	m2
11	Painting	2489.6	m2
12	Cladding	82.80	m2
Wooden work			
13	Main Door (teak wood)	13	No
14	Door (Toilet)(pvc)	13	No
15	Ventlation	4	No
16	windows	40	No
17	Inner door	1	No

Table-4

SL.NO	Description	Start	Finish	Original Duration
1	college Building	5-Sep-21	1-Mar-23	393
2	Preconstruction	5-Sep-21	31-Mar-22	151
3	Project start	05-Sep-21	6-Sep-21	1
4	Architecture Design	6-Sep-21	6-Jan-22	90
5	Basic survey	7-Sep-21	15-Sep-21	7
6	Soil investigation	7-Sep-21	15-Sep-21	7
7	Structural Design	07-Jan-22	17-Feb-22	30
8	Mep Design	18-Feb-22	31-Mar-22	30
9	Allocation of contract	18-Feb-22	31-Mar-22	30
10	Initiation	1-Apr-22	19-Apr-22	13
11	machinery mobilization	01-Apr-22	11-Apr-22	7
12	site boundary fixation	01-Apr-22	5-Apr-22	3
13	temporary connection of electrical	06-Apr-22	11-Apr-22	4
14	Engineering office and labor	12-Apr-22	14-Apr-22	3
15	Survey work for constructions	15-Apr-22	19-Apr-22	3
16	Substructure	20-Apr-22	18-May-22	21
17	marking	20-Apr-22	22-Apr-22	3
18	excavation	22-Apr-22	27-Apr-22	4
19	foundation	28-Apr-22	6-May-22	7
20	ssm	08-May-22	17-May-22	7
21	Backfilling	12-May-22	16-May-22	3
22	dpc	17-May-22	18-May-22	2
	Basement			
24	Structure	6-May-22	18-Jul-22	53
25	column concreting	06-May-22	2-Jun-22	20
26	wall construction	08-May-22	15-Jul-22	50

❖ **Activities Start & Finish Date**

Table-5

SL. NO	Description	Start	Finish	Original Duration
27	lintel beam	21-Jun-22	4-Jul-22	10
28	beam and slab work	05-Jul-22	18-Jul-22	10
29	Ground Floor			
30	Structure	19-Jul-22	29-Sep-22	54
31	column concreting	19-Jul-22	15-Aug-22	20
32	wall construction	21-Jul-22	28-Sep-22	50
33	lintel beam	02-Sep-22	15-Sep-22	10
34	beam and slab work	16-Sep-22	29-Sep-22	10
35	MEP Basement and Structure	28-Apr-22	3-Nov-22	138
36	lift casing	28-Apr-22	29-Jun-22	45
37	electrical transmission wire	30-Sep-22	6-Oct-22	5
38	electrical conduits	30-Sep-22	6-Oct-22	5
39	gasline, sewage line	30-Sep-22	6-Oct-22	5
40	OHT	30-Sep-22	13-Oct-22	10
41	water proofing	06-Oct-22	12-Oct-22	5
42	plumbing fixture	13-Oct-22	28-Oct-22	12
43	connection to water supply and gas line	30-Oct-22	3-Nov-22	4
44	Finishing (Basement)	4-Nov-22	30-Dec-22	42
45	plastering	04-Nov-22	1-Dec-22	20
46	painting	01-Dec-22	9-Dec-22	7
47	flooring	11-Dec-22	23-Dec-22	10
48	HVAC	25-Dec-22	27-Dec-22	2
49	fire fighting	28-Dec-22	29-Dec-22	2
50	cctv	29-Dec-22	30-Dec-22	2
51	Finishing (Ground floor)	1-Jan-23	1-Mar-23	44
52	plastering	01-Jan-23	27-Jan-23	20
53	painting	29-Jan-23	7-Feb-23	7
54	flooring	08-Feb-23	21-Feb-23	10
55	HVAC	22-Feb-23	23-Feb-23	2
56	fire fighting	24-Feb-23	27-Feb-23	2
57	cctv	28-Feb-23	1-Mar-23	2
58	Infrastructure	4-Nov-22	23-Dec-22	36
59	landscaping	04-Nov-22	24-Nov-22	15
60	infra road	25-Nov-22	23-Dec-22	21

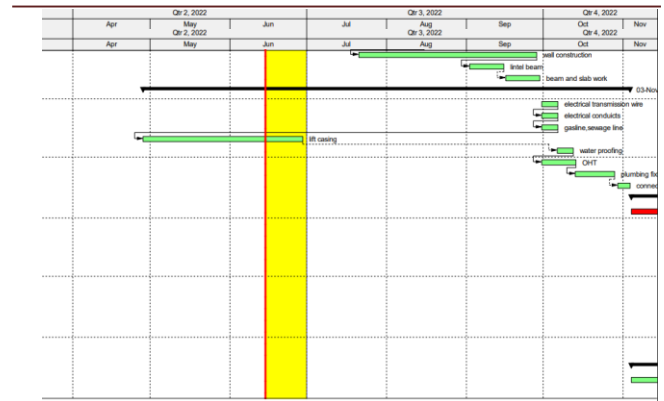


Fig-4

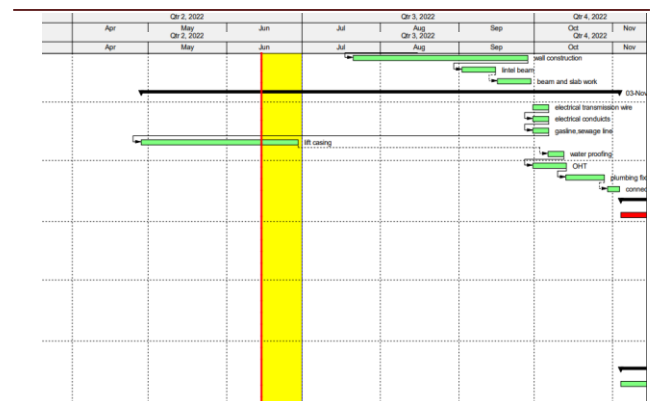


Fig-5

CONCLUSION:

1. The quantities of different elements like footing, beam, column etc can be estimated by using estimation methods like center line or long wall - short wall method and using excel format to tabulate estimated result efficiently.
2. The planning, scheduling and monitoring of the start and end dates of activities can be done for the project using primavera. The duration for the completion of the project be from 5-sep-2021 to 1-mar-2023.
3. Project management Technique helps in forecasting the project duration before starting any activity of the construction. Such that it helps to use the time efficiently and overcome any further delays in the project.
4. Hence using modern tools like primavera over conventional method help in planning, scheduling, tracking and monitoring the constructional activities efficiently.

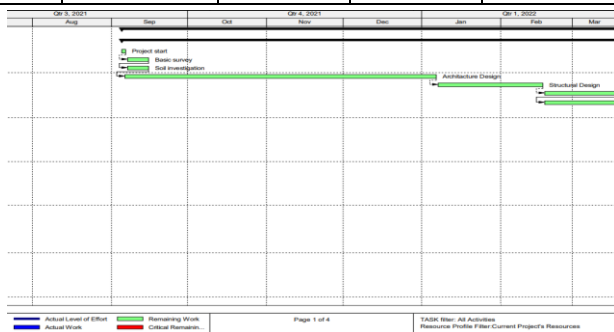


Fig-3

REFERENCES:

- [1] **“Planning, Analysis & Construction Controlling of G+5 Building by Using Primavera”**, (23 August 2021) Mr. S. V. Siva Raju, SK. Nagar Basha, SK. Mohammad Abubakr, G. Venkata Ramakrishna⁴, Gopanaboina Jhansi Bhuvanewari, Vasavada Man gamma
- [2] **“Project Management of in Construction using primavera”** (August 2017) Himanshu, Khushpreet Singh, Uma Malik
- [3] **“Planning and Scheduling of High-Rise Building Using Primavera” (June 2014)** T. Subramani¹, A. Sarkunam², J. Jayalakshmi³
- [4] DR. B.C. PUNMIA AND K.K.KHANDELWAL “PROJECT PLANNING AND CONTROL WITH PERT AND CPM”^{4TH EDITION} 2002.