PLANNING AND SCHEDULING OF G+5 BUILDING BY USING PRIMAVERA P6 SOFTWARE

Gulam Samdani[1], Mohammed Samreen[2], G Shruthi[2*], Mirza Rahmath ali Baig[2], B Sukruth[2***], G Pradeep Reddy[2****]**

[1]ASSOCIATE PROFESSOR DEPARTMENT OF CIVIL ENGINEERING IN JAYAMUKHI INSTITUTE
OF TECHNOLOGICAL SCENCES NARSAMPET, WARANGAL DIST, TELANGANA, INDIA

Abstract Now a days, the people from village are coming to towns for employment and educational facilities hence with the limited land available so as to propose the apartment building and individual houses are feasible with each other. The main objective of this project is to construction scheduling of an apartment building (G+5) using Primavera P6 software. First of all, the planning is done using AutoCAD and code refers 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 march 2024. 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.

Keywords - Primavera p6, Auto CAD, Code, planning, scheduling.

1 INTRODUCTION

Tall buildings throughout the world are

becoming popular day by day. With the technology and computers, the basic aim has been to construct safer buildings keeping in view the overall economics of the project. A high- rise building, apartment, office, apartment block, or block of flats, is a tall building or structure used for residential and or office use. Due to an increasingly competitive environment, construction companies are forced to be more efficient and achieve competitive operational advantage. Companies are always looking for improvements in equipment features, communication tools, efficient management techniques, and training human resources. Construction companies are also narrowing their focus, becoming specialists in certain types of construction projects. This specialization requires more focused project planning and controlling techniques that prove to be better for certain types of projects while providing specialized construction services.

The benefits of effective planning scheduling and control of construction projects are reduced construction time and reduced cost overruns. Planning is the process of identifying all the activities necessary to complete the project. Scheduling is the process of determining the sequential order of the planned activities, assigning realistic durations to each activity

and determining the start and finish dates of each activity. The process of converting a general or outline plan of a project into a time based graphic presentation gives information on available resources and time constraints. Construction planning is necessary for a runner to schedule also defining work tasks determining general sequence of construction methods assigning responsibility.

Project planning and scheduling

Time management can be broken down into two major categories: planning and implementation. Proper planning of the project schedule, effective use of team members and resources, and managing risks and delays are crucial to a good outcome. For construction projects, ultimate success depends on the continuous balance of a project's resources, cost, and schedule.

Project Life Cycle

The project manager and project team have one shared goal: to carry out the work of the project for the purpose of meeting the project's objectives. Every project has a beginning, a middle period during which activities move the project toward completion, and an ending (either successful or unsuccessful). A standard project typically has the following four major phases (each with its own agenda of tasks and issues): initiation, planning, implementation, and closure. Taken together, these phases represent the path a project takes from the beginning to its end and are generally referred to as the project life cycle.

Project life cycle

Project Schedule

The project schedule needs as accurate input as possible representing how the field work will proceed. Identifies interface points between contractors and subcontractors as well as milestones. Represents a work plan in progress, completed, and future in a systematic and coordinated manner. Provides team leaders with an effective tool to manage the project. Schedule management is critical for three main reasons

1. Time has no flexibility; it passes, no matter what.
2. Delivering projects on time is a challenge and a priority.
3. Project claims often center on schedule issues.

Objectives of the study

The objectives of this study are:

1. To identify construction sequence for a residential building construction.
2. To work out the practical durations required to carry out the activities.
3. To identify scheduling technique used by the organization on developing plan and scheduling.
4. To develop scheduling using primavera project planner's software.
5. To track the project and analyses the reasons for delays, and increase in estimated budget etc.
6. To investigate defects in the planning and scheduling procedure of the organization, and suggest suitable improvements in their methods.

2 LITERATURE REVIEWS

T. Subramani, A. Sarkunam, J. Jayalakshmi et.al.,(2014) 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.

This study compared time performance of the conventional method of construction for high- rise residential and Industrial Building System (IBS) method by formulate benchmark measures of industry norms for overall construction period using scheduling simulation modeling. The positive changes include creating a healthy working environment among those involved directly in the construction industry. The major players in the are architects, engineers, town planner, developer, contractor and the supplier or manufacturer have to play their roles in enhancing their working system, management and administration to enable the modernization in the industry.

Mr. S. V. Siva Raju, SK. Nagur Basha, SK. Mohammad Abubakret al.,(2021) The main objective of this project is to analyse 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 AutoCAD and code refers 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. In this project the Planning, monitoring and controlling, as well as the need and effectiveness of the project management software like Primavera P6 in a construction project of this study was to understand the role of monitoring and control in the Progress and timely completion of a construction project this objective was achieved through revision of literatures and methodology involved in monitoring and control the study proved to be a guide line in understanding the progress of construction work and also to identify the specific problems arising during the process. Results of this study show the drawbacks of the present project management system in

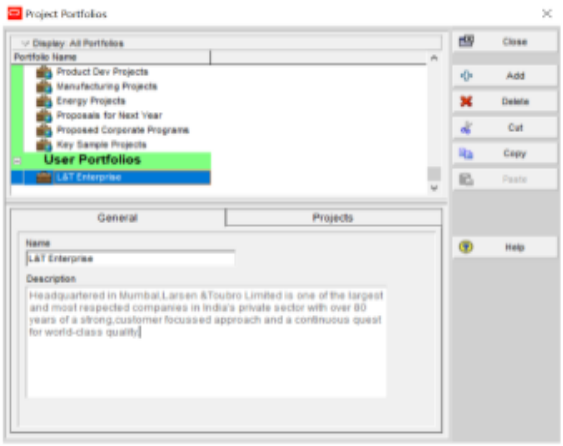
running project. an efficient and cost-effective new project management plan is brought to conclusion.

Chinmay Sunil Suryawanshi, Dr. R.P Singh Kushwah et al., (2023) In this study the Planning and scheduling have become a major concept to be considered for a smooth execution of construction works. In order to reduce the complexities, an effective tool called Oracle's Primavera P6 is used for determining an ideal schedule for construction activities. Construction planning is the necessary forerunner to scheduling and it includes determining general sequence, assigning responsibilities, defining construction methods and work tasks. Planning refers to everything you do to set up your project for success. The success or completion of any project will mainly depend upon the cost and schedule details of the project. This paper tries to explain planning and scheduling of a G+10 building using the Primavera software. In this study gives the term of culmination of venture alongside all the float values. Legitimate planning connections between the assignments is completed for the errand reliance reason. The asset assignment is completed for every single movement which are characterized at the arranging stage. In view of the examination following ends are drawn and same can be involved by the structural designing experts in the development business for decision making during development stages. The appropriate undertaking the board by utilizing Primavera can helps in satisfactorily assessment, booking and distribution of assets with least time expected for the fruition of whole task.

3 METHODOLGY

3.1 Project portfolio

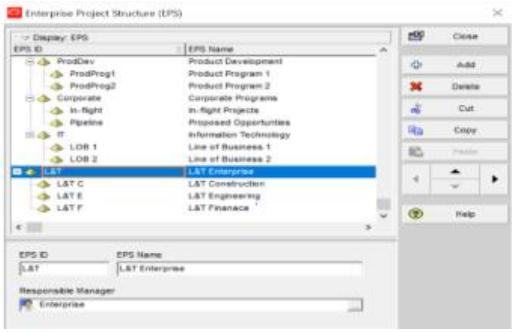
Project portfolio is a collection of projects where you can easily view data of more than one project at a time. It facilitates effective new product development and management of the projects by grouping the projects and programs together to optimize the organization or a project success. Project portfolio also allows reviewing the summary data and status information of an organization or a project.



Project Portfolio

3.2 CREATING ENTERPRISE PROJECT STRUCTURE

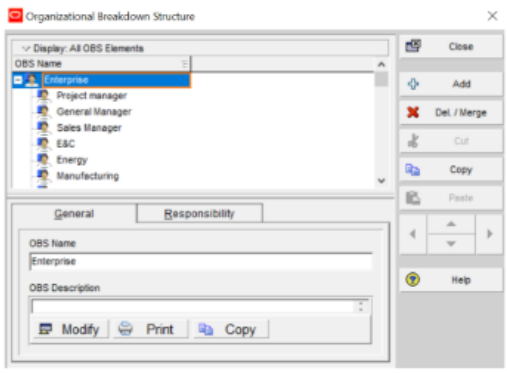
Enterprise project structure (EPS) represents the hierarchical structure of all projects in an organization. EPS will always occupy the highest level of the project management hierarchy. It can be subdivided into as many levels as needed to represent the entire work of an organization. The number of EPS levels or subsidiaries depends on the scope of the projects.s



Enterprise Project Structure

3.3 CREATING ORGANIZATIONAL BREAKDOWN STRUCTURE

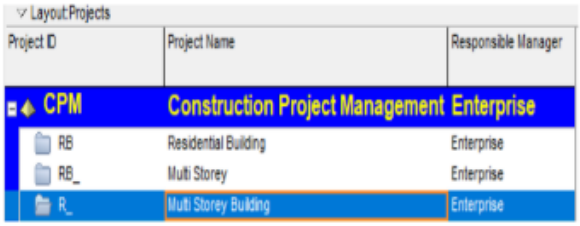
Organizational breakdown structure (OBS) is part of the CPM hierarchy which is used to identify or assign the responsible employees for a project. Example: Project Manager, Sales Manager, HR manager, etc. This is a very important phase in the project management hierarchy because the efficiency of a project will always depend on the right or skilled project manager.



Organizational Breakdown Structure

3.4 CREATING PROJECT

A project is a series of activities, which are performed to create a product, service, or a measurable business result in any organization. An ideal project will have a definite beginning and end. A project is concluded in the hierarchy, when its objectives have been reached or when the project is terminated.

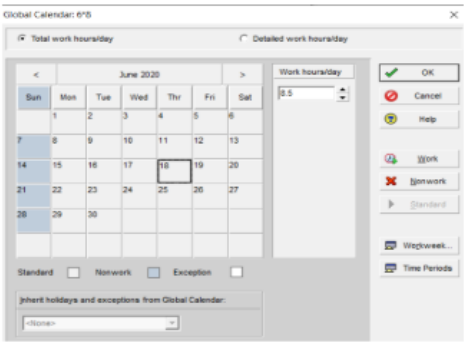


Project

3.5 CREATING CALENDAR

Calendar is assigned to activities and resources where they are used for scheduling activities and levelling resources. The Primavera P6 supports three types of calendars namely Global calendar, Project Calendar and Resource Calendar.

In this project we have used 6X8 Global Calendar

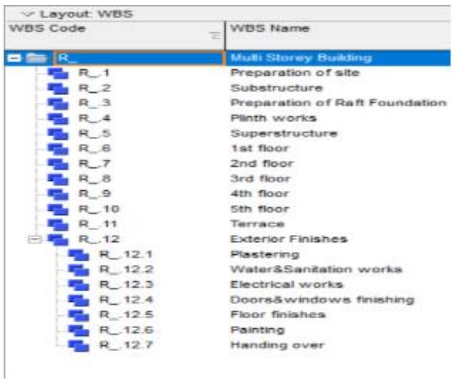


Calendar

3.6 CREATING WORK BREAKDOWN STRUCTURE

Work breakdown structure (WBS) is a hierarchical arrangement of work or activities that divides a project into discrete

levels, phases or layers. Developing WBS is the foremost step done by a project manager while creating a project. WBS is a key project deliverable that organizes the project's total work into manageable sections.



Work Breakdown Structure

3.7 CREATING ACTIVITIES

Activities also known as tasks, events or work packages. These are the lowest level of manageable work elements in a project or WBS. The completion of each activity will represent the progress of the entire project. Activities will give us clarity about the work flow in an organization.

1. Start Planning
2. Structural design
3. Site clearance
4. Marking EXC

3.8ADDING PREDECESSOR/SUCCESSOR RELATIONSHIP

The four types of relationships in Primavera P6 include the following:

1. Finish to Start or FS Relationship:

A successor activity cannot be started until a predecessor activity is finished.

2. Start to Start or SS Relationship:

A successor activity cannot be started until a predecessor activity is started.

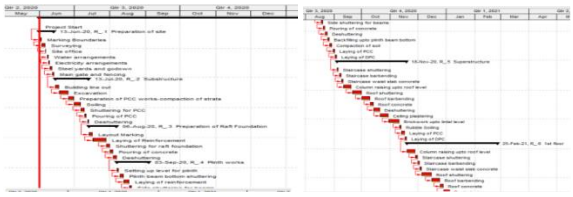
3. Finish to Finish or FF Relationship:

A successor activity cannot be finished until a predecessor activity is finished.

4. Start to Finish or SF Relationship:

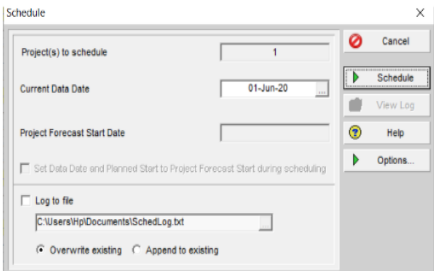
A successor activity cannot be finished until a predecessor activity is started.

3.9 CREATING GANTT CHART



3.10 SCHEDULE

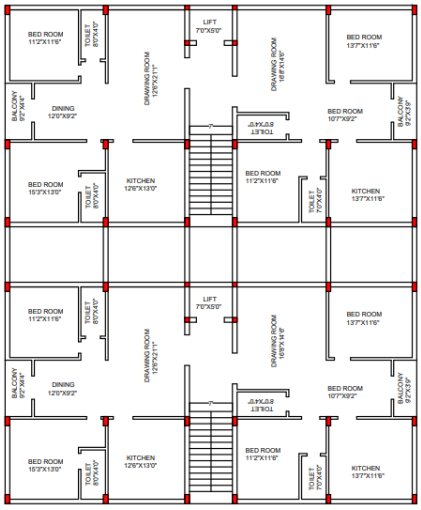
Critical Path Methodology scheduling assigns dates to project activities, calculates project's finish date and also reveals the project's critical path.



4. BUILDING DATA ASSUMED

Typical floor plan used in the study

The following is the typical floor plan used for the project



G+5 building model

Collection of data

The building data like site dimensions, preliminary data, design considerations, site conditions and soil type are collected initially which are essential measurements for designing of any structural buildings. The data is showing below for G+5 building

1. Utility of Building : Residential
2. Area of the site : 25(m)
3. Building Height : 33 m
4. Number of Storey : (G+5)
5. Type of construction : R.C.C Framed
6. Shape of Building :Rectangular
7. Number of staircase :One
8. Number of Lift :One
9. Type of Walls :Brick Wall
10. Grade of concrete :M30
11. Grade of steel :Fe500
12. Beam dimensions :600X230mm
13. Column dimensions :600mmX600mm
14. Slab thickness :150mm

5 PROJECT SCHEDULING IN PRIMAVERA

Activity ID	Activity Name	Original Duration	Start	Finish	Calendar	Activity Type
G+5 Scheduling Building		660	02-Apr-24	17-Aug-27		
G+5 Scheduling Planning and Design (New WBS)		12	02-Apr-24	29-Apr-24	Calendar Final	
A1	Start	0	02-Apr-24		Calendar Final	Start Milestone
A11	Planning	4	02-Apr-24	08-Apr-24	Calendar Final	Task Dependent
A21	Structural design	8	15-Apr-24	29-Apr-24	Calendar Final	Task Dependent
G+5 Scheduling Construction Work (New WBS)-1		326	06-May-24	05-Feb-26		
A100	Site clearance	4	06-May-24	14-May-24	Calendar Final	Task Dependent
A110	Marking	2	16-May-24	18-May-24	Calendar Final	Task Dependent
A120	EXC	4	22-May-24	30-May-24	Calendar Final	Task Dependent
A130	PCC	3	30-May-24	05-Jun-24	Calendar Final	Task Dependent
A140	Foundation	6	10-Jun-24	25-Jun-24	Calendar Final	Task Dependent
A150	Filling	3	02-Jul-24	06-Jul-24	Calendar Final	Task Dependent
A160	PB	3	06-Jul-24	12-Jul-24	Calendar Final	Task Dependent
A170	G Column	7	12-Jul-24	26-Jul-24	Calendar Final	Task Dependent
A180	G Slab	14	02-Aug-24	30-Aug-24	Calendar Final	Task Dependent
A190	1st Column	9	28-Sep-24	24-Oct-24	Calendar Final	Task Dependent
A200	1st Slab	16	05-Nov-24	05-Dec-24	Calendar Final	Task Dependent
A210	2nd Column	8	03-Jan-25	17-Jan-25	Calendar Final	Task Dependent
A220	2nd Slab	16	28-Jan-25	03-Mar-25	Calendar Final	Task Dependent
A230	3rd Column	8	03-Apr-25	16-Apr-25	Calendar Final	Task Dependent
A240	3rd Slab	16	25-Apr-25	24-May-25	Calendar Final	Task Dependent
A250	4th Column	9	24-Jun-25	10-Jul-25	Calendar Final	Task Dependent
A260	4th Slab	16	19-Jul-25	20-Aug-25	Calendar Final	Task Dependent
A270	5th Column	10	17-Sep-25	06-Oct-25	Calendar Final	Task Dependent
A280	5th Slab	16	14-Oct-25	11-Nov-25	Calendar Final	Task Dependent
A290	G walls	12	28-Oct-24	22-Nov-24	Calendar Final	Task Dependent
A300	1st Walls	15	22-Jan-25	20-Feb-25	Calendar Final	Task Dependent
A310	2nd Walls	18	21-Apr-25	22-May-25	Calendar Final	Task Dependent
A320	3rd Wall	18	15-Jul-25	19-Aug-25	Calendar Final	Task Dependent
A330	4th Wall	18	09-Oct-25	10-Nov-25	Calendar Final	Task Dependent
A340	5th Wall	18	10-Nov-25	11-Dec-25	Calendar Final	Task Dependent
A350	PPW	18	10-Nov-25	11-Dec-25	Calendar Final	Task Dependent
A360	G plastering	14	11-Dec-25	05-Jan-26	Calendar Final	Task Dependent
A370	1 plastering	15	12-Dec-25	08-Jan-26	Calendar Final	Task Dependent
A380	2 plastering	15	13-Nov-25	09-Dec-25	Calendar Final	Task Dependent
A390	3 plastering	15	15-Dec-25	09-Jan-26	Calendar Final	Task Dependent
A400	4 plastering	15	11-Dec-25	06-Jan-26	Calendar Final	Task Dependent
A410	5 plastering	15	06-Jan-26	02-Feb-26	Calendar Final	Task Dependent

A420	PPW Plastering	15	09-Jun-26	05-Feb-26	Calendar Final	Task Dependent
G+5 Scheduling Finishing Work (New WBS)-2		321	02-Feb-26	17-Aug-27		
A1000	G Wood work	7	02-Feb-26	13-Feb-26	Calendar Final	Task Dependent
A1010	1 Wood work	9	13-Feb-26	02-Mar-26	Calendar Final	Task Dependent
A1020	2 wood work	9	02-Mar-26	17-Mar-26	Calendar Final	Task Dependent
A1030	3 wood work	9	17-Mar-26	02-Apr-26	Calendar Final	Task Dependent
A1040	4 Wood work	9	02-Apr-26	17-Apr-26	Calendar Final	Task Dependent
A1050	5 Wood work	9	17-Apr-26	04-May-26	Calendar Final	Task Dependent
A1060	G Sanitary	5	04-May-26	12-May-26	Calendar Final	Task Dependent
A1070	1 Sanitary	7	12-May-26	25-May-26	Calendar Final	Task Dependent
A1080	2 Sanitary	7	25-May-26	05-Jun-26	Calendar Final	Task Dependent
A1090	3 Sanitary	7	05-Jun-26	18-Jun-26	Calendar Final	Task Dependent
A1100	4 Sanitary	7	18-Jun-26	30-Jun-26	Calendar Final	Task Dependent
A1110	5 Sanitary	7	30-Jun-26	13-Jul-26	Calendar Final	Task Dependent
A1120	G Electrical	5	13-Jul-26	21-Jul-26	Calendar Final	Task Dependent
A1130	1 Electrical	8	21-Jul-26	04-Aug-26	Calendar Final	Task Dependent
A1140	2 Electrical	8	04-Aug-26	18-Aug-26	Calendar Final	Task Dependent
A1150	3 Electrical	8	18-Aug-26	01-Sep-26	Calendar Final	Task Dependent
A1160	4 Electrical	8	01-Sep-26	15-Sep-26	Calendar Final	Task Dependent
A1170	5 Electrical	8	15-Sep-26	29-Sep-26	Calendar Final	Task Dependent
A1180	G Flooring	16	29-Sep-26	27-Oct-26	Calendar Final	Task Dependent
A1190	1 Flooring	20	27-Oct-26	01-Dec-26	Calendar Final	Task Dependent
A1200	2 Flooring	20	01-Dec-26	05-Jan-27	Calendar Final	Task Dependent
A1210	3 Flooring	20	05-Jan-27	09-Feb-27	Calendar Final	Task Dependent
A1220	4 Flooring	20	09-Feb-27	16-Mar-27	Calendar Final	Task Dependent
A1230	5 Flooring	20	16-Mar-27	20-Apr-27	Calendar Final	Task Dependent
A1240	G Painting	8	20-Apr-27	04-May-27	Calendar Final	Task Dependent
A1250	1 Painting	12	04-May-27	25-May-27	Calendar Final	Task Dependent
A1260	2 Painting	12	25-May-27	15-Jun-27	Calendar Final	Task Dependent
A1270	3 Painting	12	15-Jun-27	06-Jul-27	Calendar Final	Task Dependent
A1280	4 Painting	12	06-Jul-27	27-Jul-27	Calendar Final	Task Dependent
A1290	5 Painting	12	27-Jul-27	17-Aug-27	Calendar Final	Task Dependent
G+5 Scheduling .Final HS (New WBS)-3		0	17-Aug-27	17-Aug-27		
A1300	HS	0		17-Aug-27	Calendar Final	Finish Milestone

Gantt charts

6 CONCLUSIONS

Planning and scheduling helps to forecast and understand the progress of a construction project and it also keeps a track on the risks arising during the process. The methodology to implement construction management of a building can be explained with respect to planning, scheduling, resource allocation and levelling. Proper resource optimization is feasible during levelling of resources based on the required conditions and constraints. Primavera serves as an effective tool for generating Gantt chart for planning and scheduling a real time Multi-storey construction project. With the help of Primavera, the user can effectively:

1. ink all the activities involved in the construction of the project.
2. Determine the total duration required for the project construction.
3. Determine the Critical Path for the project schedule.
4. Keep a track of the scheduled and the on-site construction.

Assign the resources in a way that helps in reducing the time duration and cost of the project that makes it economical. The project has been completed in an efficient manner with the understanding of proper scheduling using Primavera P6 software.

REFERENCE

[1]. T. Subramani, A. Sarkunam, J. Jayalakshmi et al., (2014) " Planning and Scheduling of High Rise Building Using Primavera". T. Subramani et al Int. Journal of Engineering Research and Applications www.ijera.com ISSN : 2248-9622, Vol. 4, Issue 6(Version 5), June 2014, pp.134-144

[2]. Mr. S. V. Siva Raju, SK. Nagur Basha, SK. Mohammad Abubakr et al.,(2021) " Planning, Analysis & Construction

Controlling Of G+5 Building By Using Primavera". SSRG International Journal of Civil Engineering Volume 8 Issue 8, 31-37, Aug 2021 ISSN: 2348 – 8352 /doi:10.14445/23488352/IJCE-V8I8P104 ©

[3]. Chinmay Sunil Suryawanshi*1, Dr.R.P Singh Kushwah et al., (2023) " PLANNING AND SCHEDULING OF MULTISTORIED BUILDING CONSTRUCTION BY PROJECT MANAGEMENT TOOL PRIMAVERA P6".DO:https://www.doi.org/10.56726/IRJMETS46092

[4]. Mrs. K.Priya, Mr. M.Kathiresan, D.Vengateshwari, M.Suriyakumari, et al.,(2019) "PLANNING, ANALYSIS AND CONSTRUCTION SCHEDULING OF APPARTMENT BUILDING (G+13) BY USING PRIMAVERA P6".International Journal of Scientific Development and Research (IJSDR) www.ijsdr.org.

[5]. Pravinkumar Jagtap, Chaitanya Patel, Lisha Raorane, Akshay Salunkhe, Vijay Walekaret al.,(2022) "Planning, Scheduling, Budgeting and Tracking of a Multi-Storey Building Using Primavera P6" https://www.ijresm.com | ISSN (Online): 2581-5792

[6]. S. Rajkumaar, P. Ram Pramoth, J. Sankaranarayanan, R. Kalaivannan et al.,(2020) "
[7]. PLANNING AND SCHEDULING OF G+3 BUILDING CONSTRUCTION USING PRIMAVERA P6".Volume: 07 Issue: 08 | Aug 2020 www.irjet.net

[8]. Sourabh Sanjay Gaikwad, Dr. R.P Singh Kushwah et al., (2023) "PLANNING, SCHEDULING AND CONTROLLING OF RESIDENTIAL BUILDINGS USING PRIMAVERA & MS EXCEL".DOI : https://www.doi.org/10.56726/IRJMETS46000

[9]. P Raghunath Reddy, B.Harish Naik et al., (2016) "Planning and Resource Scheduling ofResidendial (G+7) Project Using Primavera". DOI:10.15680/IJIRSET.2016.0510122.

[10]. S M Abdul Mannan Hussain, Madamachi Mani Chakravarthy, Asra Fatima et al., (2017) " SCHEDULING OF AN RESIDENTIAL BUILDING USING PROJECT MANAGEMENT TECHNIQUES"

[11]. Meghana Kadiyala, S B Tharunika, Ramesh Kannan M et al., (2020) " Planning and Scheduling of a Multi-Storey Building using Primavera P6".Volume: 07 Issue: 11 | Nov 2020.www.irjet.net.