



IMPLEMENTING PROJECT MANAGEMENT SYSTEM IN CONSTRUCTION INDUSTRY USING PRIMAVERA SOFTWARE

¹Suraj S. Phad, ²Prof. Yogita Fulse

¹PG Student, ²Assistant Professor

¹Civil Engineering (Construction Management),

¹Sandip University, Nashik, India

Abstract: – Project Management is a critical and integral part of any construction project. Despite this, we normally observe a general lack of awareness and willingness of small construction firms regarding implementation of Project Management techniques in their projects, and this important feature is implemented only on major construction projects. Promoters and contractors of small projects are constrained by limited budgets with no provision for risk mitigation. This may often lead to projects falling into the trap of lagging behind schedule and budget overrun even with a small delay and/or additional cost. Hence it is more important for smaller project owners to including project management in their projects to ensure profitability.

The main aim of this paper is to highlight the importance of implementing project management techniques in smaller projects with the help of a case study of a Hospital Construction Project. The study also presents the detailed process of project management with the help of a popular project management tool Oracle Primavera P6.

Index Terms - Project Management, Construction, Primavera.

I. INTRODUCTION

Project Management is an integral and most important component of any construction project. It helps in identifying any project plan deviation at an early stage and ensures project's profitability through proper controlling measures.

Despite of its immense usefulness, it is generally observed that the PM techniques have lesser applications in construction and are generally limited to use in large scale projects only.

Owing to multiple unknown, unsearched reasons, small and medium scale project teams are either totally unaware about the significance of PM or they tend to look at this as an additional burden of maintaining documentation and hence choose to simply ignore the implementation of project management principle in their projects altogether. As the small projects are constrained by limited budgets with no provision for risk mitigation whatsoever, they generally do not have any scope of error and a slight deviation in the project's schedule and/or additional costs can disrupt and toss over the project's total budget entirely.

Hence, this research aims to study the impact of not implementing project management principles in a small hospital construction project. The key objectives of this research study are:

1. Demonstrate the step-by-step procedure of project management with the help of a popular project management tool Primavera P6.
2. Highlight the effects and impacts of not following project management techniques on a small Hospital construction project.

II. LITERATURE REVIEW

Various literature have been referred to for the purpose of this research and have been explained herewith.

V.S. Divyal discussed about the optimization of resource using various methods of resource allocation, resource levelling and cost trade off. Resource allocation is the scheduling of activities and the resources required by those activities while taking into construction both the resource availability and the project time. Resource levelling aims to minimize the period variation in resource loading. Resource levelling involves redistribution and imbalance of allocated work. From this thesis it is observed that

these techniques were developing to enhance the shape of the resource histogram by reducing its variations. Time cost trade of is project duration can be reduced by assigning more resources to project activity. Doing this however increases project cost. The critical path method is used for scheduling a set of project activities. The analysis of resources was done by using primavera software.

Shah Harsh, Prof Mamta Rajgor² discussed about importance of planning and scheduling of construction projects for reducing and controlling delays of the project. The main objectives of this study were to plan, schedule, and track an industrial project with the help of primavera P6 software and study the results generated. Also, to recommend measures to the organization for enhancing their project planning skills for similar projects in future. From this paper it is has been concluded that with the use of earned value performance indices such as Schedule Performance Index (SPI) and Cost Performance Index (CPI) project progress can be tracked in a better manner. About 5% reduction in the cost of labour is achieved using Primavera software.

Satinder Chopra³ concluded that the Activity ID and Activity Description both the most unused part can greatly enhance the quality of the schedule if used properly. It is the duty of the planning team to carefully decide the Activity ID structure in advance so that schedule preparation flows smoothly without any conflicts. Further research on how other fields like original duration, Remaining Duration, Tasks bars in the Gantt chart, Start and Finish dates can be presented to give maximum understanding to the user for efficient schedule development

P. Esakki Thangam⁴ have worked on the project of VOC port trust of Tuticorin. The work carried out was not done by proper planning, scheduling and resource allocation. So, that the resources were wasted and the time was extended. For reducing this wastage in time, it was done by using the primavera p6 software. In this project, the planning, scheduling, resource allocation, cost and time management were done by using primavera P6 software. This software improved the quality of construction with stipulated cost and time. Finally, implementation of sequence was done by using minimum time, cost and resources. The results revealed that the contractors and subcontractors played vital role in completion of project as scheduled. Major of the reasons was related with the contractor's performance such as lack of manpower, site management, equipment management and lack of supervision during execution. The activities that were used for the completion of the work and the step-by-step procedure for the work to be done were also scheduled in the correct manner using primavera P6 software. The project completed in contract period within 9 months.

Sachin Nalwade⁵ discussed about Earn value analysis that gave early indication that either project is delay or not and project is either over budget or under budget at any particular day by tracking it. This study discussed about main parameter involve in calculation of Earn value analysis. It concludes that primavera p6 is best tool for Earn value analysis in construction industry. And conclusion was that due to tracking and EVM will get idea about our project was going through with budgeted cost and with time or not.

Bhajanthri Thirumalesha⁶ explained about importance of resource management in construction project management for today's economy. Cost and time factors purely depend on the how the resources are effectively used in the construction project. Project manager faces the difficulties such as resource allocation and resource planning in construction projects due to large-scale projects. Thus, old method of resource management system cannot handle today's project. Primavera software help in resource management process of the project and avoids cost and time over run is stated by the authors.

J. Jayalakshmi ⁷ 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 (P6) project planning software. The comparison was made by comparing selective building components for both method of construction. This study compared time performance of the conventional method of construction for high- rise residential and Industrial Building System (IBS) method by formulating benchmark measures of industry norms for overall construction period using scheduling simulation modelling by using primavera. The positive changes include creating a healthy working environment among those involved directly in the construction industry. The major players in this 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 in dust

Suvarna P 8 This, study of, Sangapura bridge project is taken as a case study. Primavera software is used for Planning and scheduling of the bridge. Project tracking was done by considering the earned value management technique to check the cost and time overrun if exists. Project management increased the productivity of human resource and materials. Earned value management (EVM) was adapted for the project management application assessment techniques. This study is proved to be helpful in measuring time and cost performance of a project in EVM and had enabled the analysis of the efficiency of various parameters related to the progress of the project.

T. Subramani⁹ This paper outlines the fundamental principles of the EVM & how it could be used effectively for unique challenge with assists of primavera and additionally a few advantages and headaches of EVM as regards to Indian creation area. The existing have a look at deals with the scheduling and venture tracking manner alongside it also discusses principal parameter's involving in the calculation of earned cost analysis in fee and time control of civil construction project. Using an example of real time venture, methodologies and analysis are demonstrated in this paper.

Unmesh¹⁰ highlighted the importance of good planning and scheduling for sinking and scheming delays of the project. improper planning and scheduling results in extensive wastage of time & money resources each year. With globalization the construction projects have become infinite and complex. Planning of such projects requires huge amount of documentation work, which can be reduced with the help of project planning software. These studies are to plan, schedule, and track a residential project with help of primavera software, study the results generated, it is possible to propose which method is suitable for the chosen residential project.

V. Dhanalakshmi¹¹ Study deals with the project monitoring process of the economical method of transporting a pipeline construction was completed in Ennore-Trichy-Madurai. Construction work and actual progress is a comparison between the planned progress of performed in this study using project management software Primavera P6.

Ismail Abdul Rahman¹² identified time management together with their effectiveness level in large construction projects. The researcher collected data from the large-scale construction organization, and used Relative Importance Index calculation to assess the level of effectiveness which is helpful for time management techniques and software adopted in the construction project.

B.S.K. Reddy¹³ conducted resource optimization exercises on two on-going projects in Dubai, UAE. Two options were considered, first to individually level activities and second was the combined option with initially aggregating the activities and then levelling them on a combined level. It was observed that the second option clearly indicated reduction in demand of resources by 5.65%, resulting in best economy. They concluded Resource levelling at project job site and forwarding demand leads a possible sharing of resources among projects.

Fathima. Zerir T¹⁴ Scheduling using Primavera Software is a development which involves estimation, sequencing the activities, resources allocation and timing. The construction scheduling is to complete the project in time and equal the resources with the allocated time. Scheduling using primavera Software gives good controlling.

Harshali Pawar¹⁵ et al. prepared a time schedule of an under-construction G+7 Residential Building using Primavera Software. They concluded that efficient and effective planning and scheduling using primavera software helps to effective control and monitor the progress of work by surveying and reconstructing under a few changes so that the work runs hand in hand with the estimated time and budget.

BELU Nadia¹⁶, concluded that due to the globalization and internationalization of markets which have increased competitive pressures on enterprises, the companies are engaged in projects that are critical to their performance. These projects need to be managed, planned, organized, staffed, monitored, controlled, and evaluated. The project management system, Primavera, is a full solution to manage projects professionally. This paper presents an example of using the Primavera software for managing a project.

T. Subramani¹⁷, the purpose of this dissertation is in 3-fold. Firstly, Earned Value Analysis software is developed in Visual studio 2008, SQL Server 2005, .Net (C# language). Next Comparison of selected parameters between M.S Project 2007, Primavera P6 and developed software is done. Therefore, it can be concluded that the software could be used in a wide range of projects for Earned Value Analysis calculation.

Mohammad Zaki Haider¹⁸, created a project schedule and attempted to complete a project within the allotted gross budget by implementing project management tools to create a proper plan and schedule. They used Oracle Primavera P6 and showed that proper resource allocation and project portfolio management can be achieved by sitting on single system.

III. FINDING OF LITERATURE REVIEW

Project Management Techniques are regularly applied on Construction Projects. A lot of literature on the topic of Construction Project Management is available in the media and scholarly articles.

Upon literature review it was identified that most of the research work done till now focusses on only large-scale projects. There is no literature available and research work done on the applicability and need of using Project Management Techniques on small scale projects. This Research Gap needs to be filled, and hence this study is aimed at studying the applicability of PM techniques on a small-scale project.

IV. METHODOLOGY

Flow of the study: - All in all, the entire process flow will be divided in the following steps:

Step#1:	Selection of the Case Study	
Step#2:	Data Collection	→ Project Schedule
Step#3:	Learning PM Tool	→ Primavera
Step#4:	Processing Data	→ Making Schedule in Primavera
Step#5:	Monitoring & Controlling Progress	→ Entering Site Progress data & Generating KPI Reports

DATA COLLECTION:

The present research uses a live small Hospital Construction Project as a case study to achieve the project goals.

Case Study:



Fig. 1 – Site Photographs

SITE DETAILS

Name and address of owner : - Shree Narayani Health Care Pvt. Ltd , Shreyas Hospital, Behind The Hotel Surya , Prasanna Colony, Mumbai Agra Road Nashik.

Type Of Building : - Hospital

Contractor : - Anand Construwel Pvt. Ltd

Architect : - Kshitij Dhande

Structure Engineer : - Yogini Kulkarni

Project Information

1. The project in the present case study is a commercial building – a hospital.
2. The total Built-up Area of the Hospital Building is 6000 Sq.M (64,000 Sq.Ft.)
3. Building consists of Basement + 6 Floors. Basement is proposed to be used entirely for parking purposes.
4. Initially, the project was decided to be completed within 14 months.
5. A Project Schedule was prepared in the Project Management Software Microsoft Project (MSP).

V. ANALYSIS, RESULTS AND DISCUSSION

The information collected from the site regarding initial project planning data and the subsequent project progress data was entered in Primavera. Various reports were then generated from the same as shown below:

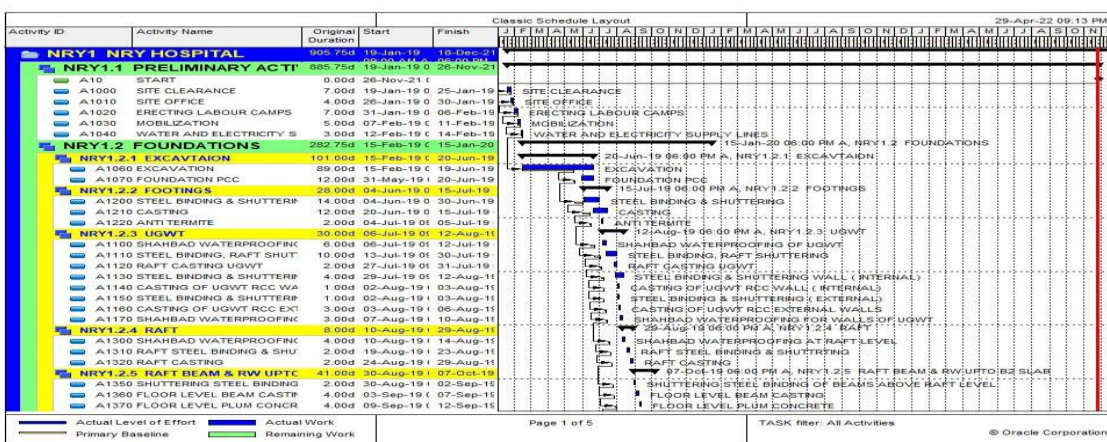


Fig. 2 – Gantt Chart

Gantt Chart is one of the basic output charts that is generated from a project’s schedule. The Gantt Chart gives an overall idea of the project plan and current status.

NRY HOSPITAL
Report Date 29-Apr-22 11:53 PM

AC-02 Activity Costs

WBS	Activity ID	Activity Name	Activity Status	BL Total Cost	Actual Total Cost	Remaining Total Cost	Variance - Total Cost
Enterprise	NRY1	All Initiatives					
	NRY1	NRY HOSPITAL					
	NRY1.1	PRELIMINARY ACTIVITIES					
	A10	START	Not Started	₹0.00	₹0.00	₹0.00	₹0.00
	A1000	SITE CLEARANCE	Completed	₹0,999,992	₹3,571,368	₹0.00	₹1,428,556
	A1010	SITE OFFICE	Completed	₹300,000.00	₹300,000.00	₹0.00	₹0.00
	A1020	ERECTING LABOUR CAMPS	Completed	₹300,000.00	₹300,000.00	₹0.00	₹0.00
	A1030	MOBILIZATION	Completed	₹20,000.00	₹16,000.00	₹0.00	₹4,000.00
	A1040	WATER AND ELECTRICITY SUPPLY LINES	Completed	₹75,000.00	₹75,000.00	₹0.00	₹0.00
	Subtotal			₹704,999.92	₹759,571.36	₹0.00	(₹54,571.44)
	NRY1.2	FOUNDATIONS					
	NRY1.2.1	EXCAVATION					
	A1060	EXCAVATION	Completed	₹3,275,200.00	₹3,275,200.00	₹0.00	₹0.00
	A1070	FOUNDATION RCC	Completed	₹5,392,440.00	₹5,413,600.00	₹0.00	(₹21,160.00)
	Subtotal			₹8,667,640.00	₹8,688,800.00	₹0.00	(₹21,160.00)
	NRY1.2.2	FOOTINGS					
	A1200	STEEL BINDING & SHUTTERING	Completed	₹2,949,890.00	₹3,225,900.00	₹0.00	(₹276,110.00)
	A1210	CASTING	Completed	₹96,000.00	₹96,000.00	₹0.00	₹0.00
	A1220	ANTI TERMITE	Completed	₹96,000.00	₹96,000.00	₹0.00	₹0.00
	Subtotal			₹3,041,890.00	₹3,417,900.00	₹0.00	(₹376,010.00)
	NRY1.2.3	UGWT					
	A1100	SHAHBAD WATERPROOFING OF UGWT	Completed	₹260,496.00	₹261,600.00	₹0.00	(₹1,104.00)
	A1110	STEEL BINDING, RAFT SHUTTERING	Completed	₹321,480.00	₹321,480.00	₹0.00	₹0.00
	A1120	RAFT CASTING UGWT	Completed	₹571,344.00	₹589,080.00	₹0.00	(₹17,736.00)
	A1130	STEEL BINDING & SHUTTERING WALL (INTERNAL)	Completed	₹175,448.00	₹180,350.00	₹0.00	(₹4,902.00)
	A1140	CASTING OF UGWT RCC WALL (INTERNAL)	Completed	₹145,780.00	₹146,140.00	₹0.00	(₹360.00)
	A1150	STEEL BINDING & SHUTTERING (EXTERNAL)	Completed	₹374,340.00	₹380,480.00	₹0.00	(₹6,140.00)
	A1160	CASTING OF UGWT RCC EXTERNAL WALLS	Completed	₹468,664.80	₹469,300.00	₹0.00	(₹635.20)
	A1170	SHAHBAD WATERPROOFING FOR WALLS OF UGWT	Completed	₹969,264.00	₹969,600.00	₹0.00	(₹336.00)
	Subtotal			₹3,286,816.80	₹3,318,210.00	₹0.00	(₹31,393.20)
	NRY1.2.4	RAFT					
	A1300	SHAHBAD WATERPROOFING AT RAFT LEVEL	Completed	₹1,762,400.00	₹1,800,000.00	₹0.00	(₹37,600.00)
	A1310	RAFT STEEL BINDING & SHUTTERING	Completed	₹1,111,090.00	₹1,136,890.00	₹0.00	(₹25,800.00)
	A1320	RAFT CASTING	Completed	₹1,612,419.20	₹1,654,600.00	₹0.00	(₹42,180.80)
	Subtotal			₹4,485,909.20	₹4,591,490.00	₹0.00	(₹105,580.80)

Fig. 3 – Activity Costs

This report shows the Activity wise Project Costs, including the current status of activity.

WBS – Cost & Schedule Variance: This is a custom report built in Primavera. This report is a quick snapshot of the project performance status on any given date.

It clearly indicates WBS Level Variance in Project’s Cost & Schedule.

NRY HOSPITAL			
WBS - COST & SCHEDULE VARIANCE			
WBS Code	WBS Name	Variance - BL Project Duration	Variance - BL Project Total Cost
NRY1	NRY HOSPITAL	-217.00d	(₹8,939,652.68)
NRY1.1	PRELIMINARY ACTIVITIES	-863.75d	(₹54,571.44)
NRY1.2	FOUNDATIONS	-63.00d	(₹961,728.20)
NRY1.2.1	EXCAVATION	-106.00d	(₹21,160.00)
NRY1.2.2	FOOTINGS	-12.00d	(₹310,694.00)
NRY1.2.3	UGWT	-7.00d	(₹31,393.20)
NRY1.2.4	RAFT	-9.00d	(₹105,590.80)
NRY1.2.5	RAFT BEAM & RW UPTO B2 SLAB	-11.00d	(₹128,932.60)
NRY1.2.6	B2 SLAB CASTING	-9.75d	(₹194,789.20)
NRY1.2.6.1	RETAINING WALL	-2.00d	(₹69,690.00)
NRY1.2.7	B1 SLAB CASTING	-11.25d	(₹169,178.40)
NRY1.3	SLAB CASTING	-66.25d	(₹507,770.90)
NRY1.3.1	F1 SLAB CASTING	-10.00d	(₹74,357.00)
NRY1.3.2	F2 SLAB CASTING	-10.00d	(₹108,406.00)
NRY1.3.3	F3 SLAB CASTING	-7.00d	(₹25,068.00)
NRY1.3.4	F4 SLAB CASTING	-11.00d	(₹16,517.70)
NRY1.3.5	F5 SLAB CASTING	-8.00d	(₹260,275.20)
NRY1.3.6	TERRACE SLAB CASTING	-17.00d	(₹23,147.00)
NRY1.4	BBM, INTERNAL PLASTER, GYPSUM PUNNING & FIREFIGHTING	-11.00d	(₹1,989,511.50)
NRY1.5	ELECTRIFICATION	1.00d	₹0.00
NRY1.6	INTERNAL PLUMBING	-5.00d	₹0.00
NRY1.7	EXTERNAL PLASTER	-16.00d	(₹1,628,505.00)
NRY1.8	INTERNAL PLASTER	-15.00d	(₹1,659,667.00)
NRY1.9	EXTERNAL PLUMBING	-9.00d	(₹966,377.11)
NRY1.10	WATERPROOFING	-13.00d	(₹31,012.20)
NRY1.11	DADO, FLOORING & WINDOW SILLS	-14.00d	(₹209,121.00)
NRY1.12	FALSE CEILING WORK	-9.00d	(₹463,360.80)
NRY1.13	INTERNAL PAINTING & DOOR	-32.00d	(₹36,470.40)
NRY1.14	EXTERNAL PAINTING	-3.00d	(₹28,900.00)
NRY1.15	SANITARY & CP FITTINGS	-2.00d	(₹402,657.13)
NRY1.16	FIREFIGHTING	-9.00d	₹0.00
NRY1.17	LIFT INSTALLATION	-23.00d	₹0.00
Total		-217.00d	(₹8,939,652.68)

Fig. 4 – WBS – Cost & Schedule Variance

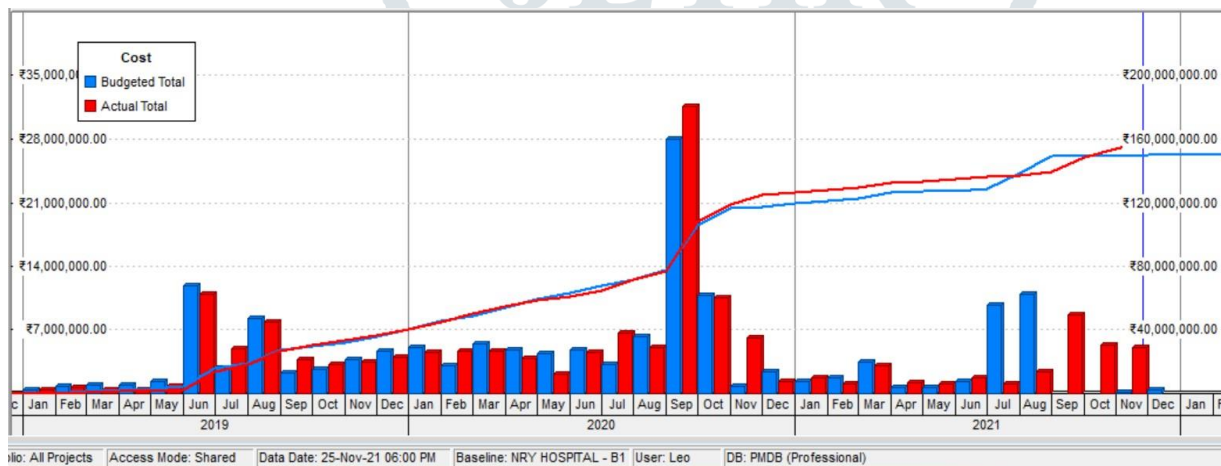


Fig. 5 Project Costs – S-Curve

Project Costs – S-Curve shows Cumulative Costs – Budgeted Vs Actual

RESULTS

From the above analysis, the following results have been deduced.

- ❖ Project schedule Performance:
BEHIND SCHEDULE BY 217 DAYS.
- ❖ Project Cost Performance:
OVERBUDGET BY RS. 89,39,652.

The above figures clearly indicate and demonstrate that the Project falls in the worst-case scenario that is of Lagging behind Schedule and Over Budget.

This also highlights the significance of following Project Management principles even if the project is small scale.

DISCUSSIONS

1. Initial Project Schedule prepared but resources not loaded and hence cost could not be monitored.
2. Big challenges faced during excavation stage, due to hard rocky strata and extra time & cost lost.
3. Due to Corona crisis, labour and material shortage – hence extra costs of acquiring labour and materials.
4. Loose project control exercised on account of fear of losing labour.
5. Labour camps had to be erected on site to ensure work progress although at a very slow pace.

CONCLUSION: As a result of the detailed study performed for a small Hospital Construction Project, the following conclusions can be drawn:

Project Management is very important and integral part of any construction project.

Smaller projects have limited budget and no provision for risk mitigation. A small deviation in time and cost can disrupt the entire future cashflows and poses a clear threat to project's profitability.

Hence, smaller project stakeholders need to take extreme due diligence to ensure project's ultimate success

Primavera P6 is one of the most powerful and popular tool for Project Management used worldwide.

By implementing the project management principles with Primavera P6 on small projects, the project team can ensure project success to a higher degree of confidence.

REFERENCES

1. V.S. Divya¹ Flexible Scheduling for Construction by Using Primavera Software Iconic Research and Engineering Journals Nov 2019 Ire Journals Volume 3 Issue 5 ISSN: 2456-888
2. Shah Harsh, Prof Mamta Rajgor, Dr Jayeshkumar Pitroda², "A Critical Literature Review on Implementation of Primavera Software on Construction Project International Journal of Creative Research Thoughts (IJCRT) November 2017 Volume 5, Issue 4 ISSN: 2320-2882
3. Satinder Chopra, Arvind Dewangan, Developing an Efficient Schedule in Primavera P6: Significance of Activity ID & Descriptions, International Journal of Innovative Research in Science, Engineering and Technology an ISO 3297: 2007 Certified Organization Vol. 3, Issue 7, July 2014
4. P. Esakki Thangam, R. Magdalene Benila, Planning, Scheduling and Time Management of Six Lanes Road Construction Work at V.O.C Port Trust using Primavera P6 Software IJSTE - International Journal of Science Technology & Engineering Volume 2 Issue 11 May 2016
5. Sachin Nalawade¹, Omkar Ghode², Piyush Vaidya³ Earn value analysis of construction project using primavera p6 Cikitusi Journal for Multidisciplinary Research ISSN No: 0975-6876 Volume 6, Issue 5, May 2019
6. Bhajanthri Thirumalesha, Rajani V. Akki, Basavaraj Bavi Resource Optimization in Construction of A Residential Apartment using Primavera P-6 Software International Research Journal Of Engineering And Technology Volume: 04 Issue: 06 June -2017 ISSN: 2395 -0056
7. T. Subramani, A. Sarkunam, J. Jayalakshmi Planning and Scheduling of High-Rise Building Using Primavera Int. Journal of Engineering Research and Applications ISSN: 2248-9622, Vol. 4, Issue 6 (Version 5), June 2014, pp.134-144
8. Suvarna P Yateen Lokesh Dr. S.P. Mahendra Planning, Scheduling and Tracking of Ongoing Bridge Construction Project Using Primavera Software and EVM Technique International Journal of Applied Engineering Research ISSN 0973-4562 Volume 13, Number 7 (2018) pp. 209-214
9. T. Subramani, D. S. Stephan Jabasingh, J. Jayalakshmi, Analysis of Cost Controlling in Construction Industries by Earned Value Method Using Primavera, International Journal of Engineering Research and Applications, 2014, Vol. 4, Issue 6, pp. 145-153.
10. Unmesh. Y. Polekar, Rohit. R. Salgude, Planning, Scheduling and Tracking of a residential Project using Primavera Software, International Journal of Advance Research in Computer Science and Management Studies, Volume 3, Issue 5, May 2015
11. Dhanalakshmi, High-cost infrastructure report monitoring by p6 software, International conference on engineering innovations and solutions (ICEIS – 2016)
12. Aftab Hameed Memon, Ismail Abdul Rahman, Ismaaini Ismail, Noor Yasmin Zainun, "Time Management Practices in Large Construction Projects", Conference: IEEE Colloquium on Humanities Science and Engineering (CHUSER 2014)

13. B.S.K. Reddy, SK. Nagaraju, MD. Salman, "A STUDY ON OPTIMISATION OF RESOURCES FOR MULTIPLE PROJECTS BY USING PRIMAVERA", Journal of Engineering Science and Technology, Vol. 10, No. 2 (2015), pp. 235 – 248.
14. Fathima Zerine T, Angela C. Joy, "Construction Management using Primavera", International Journal of Science and Research, 2018, pp. 520-523.
15. Harshali Pawar¹, Ritali Wagh¹, Shrutika Shahane¹, Maya Kakad¹, Vaishnavi Kakad Planning and Scheduling of High-Rise Building Using Primavera, International Journal of Scientific Research in Science, Engineering and Technology, Volume 4 Issue 4 ISSN: 2395-1990 March 2018
16. Nadia, B.E.L.U., And ANGHEL Daniel–Constantin¹ Iliesorin, Project Management Using Primavera for Enterprise System. Fomate 9.19 (2010), pp. 17-21.
17. T. Subramani, D. S. Stephan Jabasingh, J. Jayalakshmi, Analysis of Cost Controlling in Construction Industries by Earned Value Method Using Primavera, Int. Journal of Engineering Research and Applications ISSN: 2248-9622, Vol. 4, Issue 6(Version 1), June 2014, pp.145-153
18. Mohammad Zaki Haider¹, Rajendra S², Vijay K³, Planning, Tracking and Application Administration using primavera web logic p6, IJRET, 2016, eISSN: 2319-1163 / pISSN: 2321-7308.

