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SCHEDULING AND LABOUR MANAGEMENT FOR RESIDENTIAL BUILDING PROJECT USING PRIMAVERA

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Abstract - *Construction industry helps in the nation's economic growth in developing countries like India. Effective project management helps in achieving the aim of the project. Project management software's have become a necessary tool in the construction industry. Primavera P6 is effective project management software tool used for scheduling, distributing resources, monitoring and controlling various activities involved in the project. This present study involves scheduling, assigning resources and management of labours for various activities at Foundation's Silver Spring Residential project, Mysore. The scheduling of various tasks is done for 4 months. Labour management helps in the distribution different types of labours to different activities. An efficient schedule with controlling and monitoring of the project and management of labours during execution helps to complete the project within the target time and cost.*

Key Words: **Project Management, Schedule, Labour management, Primavera P6.**

1. INTRODUCTION

Construction sector is the largest sector in the world. In India it is the second largest after agriculture. Construction industry leads to the economic growth of the country. Construction sector consumes a very wide employment opportunities for the labours. The rural areas need a development in economic, environment and land use planning to support the status of development in urban regions. Large amount of money and jobs are provided in construction industry than any other industry in India. Construction plays an important role in the development of agriculture, transportation, infrastructure of civil, manufacturing and communication sectors. Generally construction sectors are more challenging compared to other industries because of its unique nature and every project has its own kind. And construction projects are constrained by money, quality and time. Achieving the goal or project in time shows the effective project management. If the project is inadequate i.e., lack of proper contract planning and management, implementation of poor planning, lack of management during execution leads to cost and time overrun. By proper skillful management, the project can be completed in time with the estimated cost.

1.1 Schedule of the Project

The scheduling of construction project is a complete and powerful management tools. This process determines the work activity timings which identified in the process of planning and finally it shows in the schedule of project. "Scheduling is a sequencing and arrangement of each activities with the graphical representation required to complete the work".

Steps initiated in schedule development of the project are as follows

- Estimate the time required for each activity.
- Time required for completion of project is estimated.
- Defining interval of the time in each activity i.e., when to start and finish.

1.2 Labour Management

It is an interacting relationship between labour and management. In construction sector, the project mainly focuses on optimum resources usage and speedy completion of the project. It is one of the most important concept in construction project management. If labour management is effective, the project will be complete in time with the quality. Labour productivity is one of the major problem in construction industry. About 30 to 50% of cost depends on labour management.

2. METHODOLOGY

In the present scenario construction projects have become wide and complex so the companies started developing the software for project management such as Microsoft project, primavera P3, P6 etc. The study involves scheduling and labour management. The following steps are involved in the methodology.

2.1 Schedule Development

In this process the project manager or scheduler should estimate the time and develop the project schedule. The schedule layout is prepared for the project activities, determining the start and finish date, finalizing the durations and sequencing of activities. Activity duration and resource estimating are repeated several times to actually come up with the schedule of the project. The project schedule is developed by using Primavera software with the help of collected data. Once the project is scheduled the base line is set to track the progress. The activities are as per the calendar set by the company.

To develop the schedule of Foundations Silver Springs residential building project, the following steps are carried out:

- Defining of activities in the project
- The sequencing of the activities in the project
- Fixing of start and finish date for the activities
- Estimation of the resources required
- Using above information schedule is developed by Primavera software.

Activity ID	Activity Name	Original Duration	Resources	Start	Finish
Foundation Silver Spring final		126		14-Dec-15 A	11-May-16
Structural work		100		14-Dec-15 A	11-Apr-16
4th floor		32		14-Dec-15 A	19-Jan-16
Column		6		14-Dec-15 A	19-Dec-15 A
A1020	Concreting	1	C.Mason, C.M.Hel	19-Dec-15 A	19-Dec-15 A
A1010	Shuttering	3	Carpenter, C.Help	16-Dec-15 A	18-Dec-15 A
A1000	Reinfocement	4	Fitter, F.Helper, U.	14-Dec-15 A	17-Dec-15 A
Slab and Beam		21		23-Dec-15 A	15-Jan-16
A1050	Concreting	1	C.Mason, C.M.Hel	15-Jan-16	15-Jan-16
A1040	Reinforcement	9	Fitter, F.Helper, El	05-Jan-16 A	14-Jan-16 A
A1030	Shuttering	11	Carpenter, C.Help	23-Dec-15 A	04-Jan-16 A
Staircase		3		16-Jan-16 A	19-Jan-16 A
A1090	Concreting	1	C.Mason, C.M.Hel	19-Jan-16 A	19-Jan-16 A
A1070	Reinforcement	1	Fitter, F.Helper, U.	18-Jan-16 A	18-Jan-16 A
A1060	Shuttering	1	Carpenter, C.Help	16-Jan-16 A	16-Jan-16 A
5th floor		36		20-Jan-16 A	02-Mar-16 A
Column		6		20-Jan-16 A	29-Jan-16 A
A1110	Concreting	1	C.Mason, C.M.Hel	29-Jan-16 A	29-Jan-16 A
A1100	Shuttering	3	Carpenter, C.Help	25-Jan-16 A	28-Jan-16 A
A1090	Reinfocement	4	Fitter, F.Helper, U.	20-Jan-16 A	23-Jan-16 A
Slab and Beam		21		30-Jan-16 A	23-Feb-16 A

Fig -1: Schedule preparation

2.2 Planning Resources

- Identifying the resources required for the Foundation Silver Springs residential building project.
- Selecting the specific resources required for the project (Labour, Non-labour, material).
- Estimating the labour required for each activity and defining different types of labours in Primavera.

Display: Current Project's Resources

Resource ID	Resource Name	Resource Type	Unit of Measure	Primary Role	Default Units / Time
R-2.2	F.Helper	Labor			64/d
R-3.2	M.Helper	Labor			32/d
R-4.2	P.M.Helper	Labor			96/d
R-5.2	C.M.Helper	Labor			80/d
R-6.2	E.Helper	Labor			32/d
R-7.1	U.Labour	Labor			160/d
R-1.2	C.Helper	Labor			144/d
R-2.1	Fitter	Labor			96/d
R-3.1	Mason	Labor			32/d
R-4.1	P.Mason	Labor			80/d
R-5.1	C.Mason	Labor			24/d
R-6.1	Electrician	Labor			24/d
R-1.1	Carpenter	Labor			96/d

Fig-2: Types of labours

Fig-3: Assigning of labours

2.3 Project Monitoring and Controlling

As the project starts, the necessary data's are collected at every stages and periods. Updating the progress of the project using Primavera. The required data's for updating the progress of project are

a. Actual start date and end date
b. Percentage of complete of the activities
c. Remaining duration to complete
d. Resources used
e. Remaining resources to complete the activity
f. Comparison between planned and actual schedule

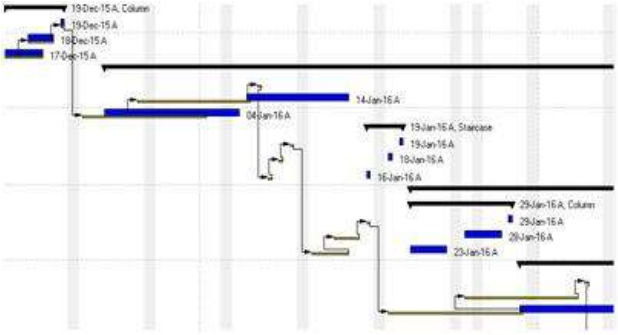

Fig-4: Comparison between planned and actual schedule

3. RESULTS AND DISCUSSIONS

Results are final product which comes from the overall process of the project. By doing the schedule of the project efficiently it leads to the success. While preparing the schedule using primavera software the constraints should be mentioned and delaying of project in execution by creating baseline.

3.1 Schedule of the Project

Fig-5: Schedule of the structural work

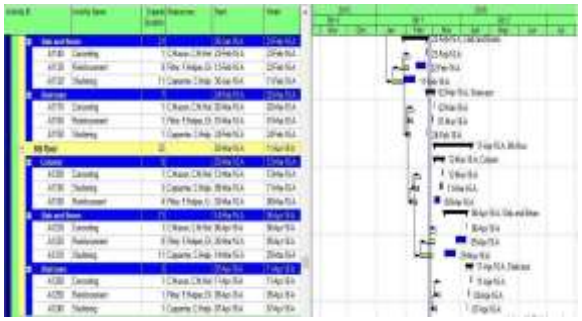

Fig-6: Schedule of the structural work

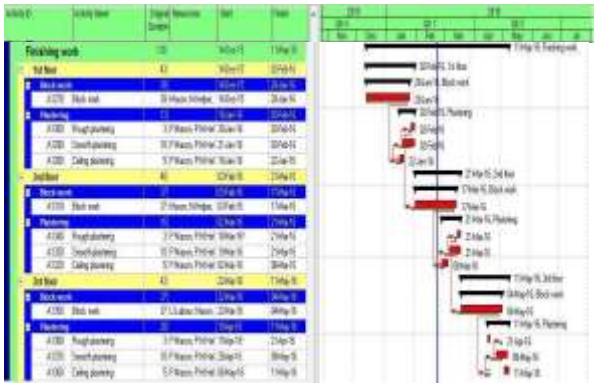

Fig-7: Schedule of the finishing work

3.2 Labour Assignment for Activities

Calculation of labour units required for the activities in project are assigned for the activities. The labours are assigned for the prepared schedule in Primavera software. The Figure shows the resources sheet of Primavera which contains different types of labours used in the project.

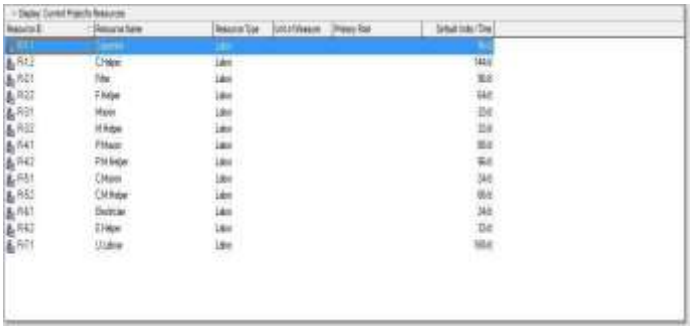

Fig-8: Resource sheet

3.3 Tracking

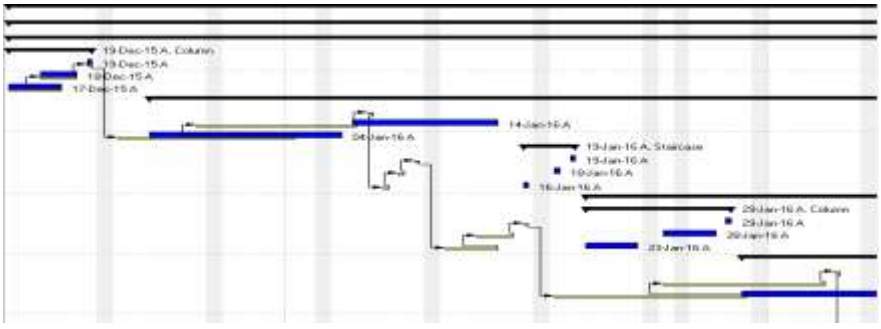

Fig-9: Shows the Comparison of Planned and Actual Work

4. CONCLUSIONS

- Project management software like Primavera helps to plan, schedule, monitor and control the activities involved in the construction project more effectively and efficiently.
- The graphical representation of various activities provides information about the critical path and delay of the project.
- Labour management acts as a tool to optimize the various types of labours involved in various activities.
- An effective and efficient usage of labour management improves the productivity of the project so as to achieve the organization goal.

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