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RESOURCE OPTIMIZATION IN CONSTRUCTION OF A RESIDENTIAL APARTMENT USING PRIMAVERA P-6 SOFTWARE

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Abstract – *Resource management is the important feature of the construction project management in today's economy. Cost and time factors purely depends 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. To overcome by the difficulties some software was introduced like primavera can manage the projects in proper way. This software will help in resource management process of the project and avoids cost and time over run*

Key Words: *construction project, Planning, Scheduling, Resource optimization, Primavera p-6.*

1. INTRODUCTION

"The two main important factors in the construction field are time and money". Time and money are mainly depending on the utilization of available resource and effective management, and proper planning at the right time and right place. There are three main resource in the construction field are man power, materials, machineries. The whole construction project purely depends on proper utilization of available resource. If not proper utilization of resource the project will be lost due to excess of time and cost.

Construction industry is an integral part of India this industry is one of the largest industries in India. India is right now one of the fastest growing infrastructure country , here is huge difference in development of rural and urban areas here need effective project management , many problems and issues arises in construction industry due to poor planning , improper management , non availability of resource , climatic changes which will effects the project cost and project duration.

One of the complicated tasks in the civil construction field is managing resource whether it is man power or material; in resource numerous types of resource are available in man power and materials. different type of task will be executed day by day, distribution of resource for each activity is difficulty , sometimes it will be over allocated , sometimes it will be less allocation all the above things make optimization process is very difficult .resource management means supplying and supporting resource to each activities of the project within the project cost.

Planning and scheduling is important technique of the management. Planning is necessary to understand the proper utilization of human and material resource and to tackle the problems related to delay of construction project.

Project management carry out the activities of the project as per plan, schedule and allocation of the resource to these activities at the right time and right place, so each activity will be completed within time and cost. Commonly CPM /PERT methods is widely used for scheduling of the project which helps the project management CPM is better compare to PERT method. CPM method is reliable to management it provides minimum time need to complete the project and also gives the information about future problems related to delay of project.

Resource scheduling is very important task for the successful completion of the project. Resource scheduling includes the resource allocation to various activities and leveling the resources. Resource leveling is a technique to balance over allocated resource of the activities and resolve the conflicts between different resources.

in large scale industries is very difficult to do accurate planning and scheduling of resource in this case number of activities is more hence it's very difficult, thus now days large scale projects planning and scheduling will be done by software's (Microsoft project) and PRIMAVERA. PRIMAVERA software is advanced software than MSP .it is widely used software in the large scale industries. PRIMAVERA software can manage hundred's of project at a time.

2. OBJECTIVES

1.To study the importance of resource used in this project.

2.To understand the importance of resource management.

3. To study the effects of resource on project.

4. To study how to find out the over allocated resource and how to balance it.

5. to study PRIMAVERA software, its features and benefits of primavera.

6. Utilization of PRIMAVERA for resource management in construction project.

3. METHODOLOGY

Project management in earlier days was being carried out by critical path method (CPM) and Project Evaluation Technique (PERT) now a day's project is managed by some of software's like Micro soft project(MSP) and Primavera software these are two software's are most useful software in the construction industries in India. In this software, Primavera software has been selected to manage the resource which is used in the project and also optimized the available resource

the study have been carried out in two phase , in one phase collecting the required data and calculate the quantities are assigned in Primavera with some specific duration to the requirement of assigned activity with respect to quantity resource will be assigned to these activities and find out the over allocation resource and resource leveling will be performed.

3.1 Data collection

Collecting the data about the resource used in a construction project by

- By Drawings of the project.
- By Quantity survey of the project.

3.2 Understanding the data

Understand the resource and data which is collected from site

3.3 Learning the primavera software

Learning the Primavera software to understand its functions and features and step by step procedure which helps to know the status of the project cost spent and time required to complete the remaining project while its construction

3.4 Planning

After collecting the data verifying the quantities and planning should be done

3.5 Scheduling

Process had to be done. It involves creating calendar, work break down structure (WBS) and allotting duration for each activity.

The Calendar in my project is

- 8 hrs per day for working hrs of labor from morning 9am to 6 pm with one hr Lunch break
- Sunday is also working day for 8 hrs
- Holiday's for labor is government holidays like Republic day

3.6 Resource Allocation

After scheduling, the resource table is prepared and this prepared resource are assigned to each activities of the project commonly resource divided labor, Non- labor, and material in the software. Resources are calculated according to quantity of the activity.

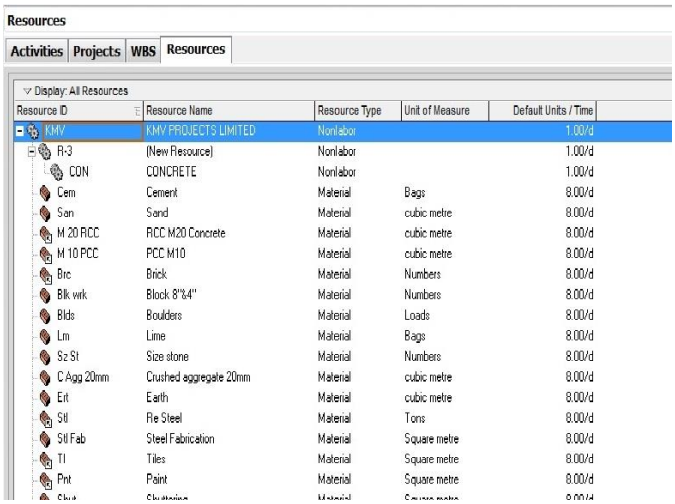

Fig.1 Details of resource

3.7 Resource optimization

We can't optimize or reduce the material resource but we can optimize the man power resource while leveling the various resource, there are some probabilities in which one can optimize the resource

In this project different type probabilities are carried out are as follows

- Level all the resource with Preserving scheduling early and last dates
- Level all resource within Float Preserved scheduled early and late dates

- Level Particular resource within Float preserving scheduled early and late dates
- level Particular resource within Float Preserving scheduled early and late date

Since mason, mason helper, carpenter, carpenter helper, Bar bender, Bar bender helper, Painter, Painter helper are those Labor resources which were used in throughout the project and chosen them to optimize all above probabilities were applied for the project to get best results. A comparison was made among them and to choose best one which is comfort with site conditons.

4. Case study of Residential Apartment

The case study has taken G+2 Residential apartment building with two blocks located at Navalgunda, Karnataka. The name of site is Karnataka police quarters building.

4.1 Leveling procedure

After going through all the possible option for this case study in leveling procedure, **PROBABLITY 4** is the suitable for leveling without affecting project duration. Thus in this case **PROBABLITY 4** is used to optimize the resources.

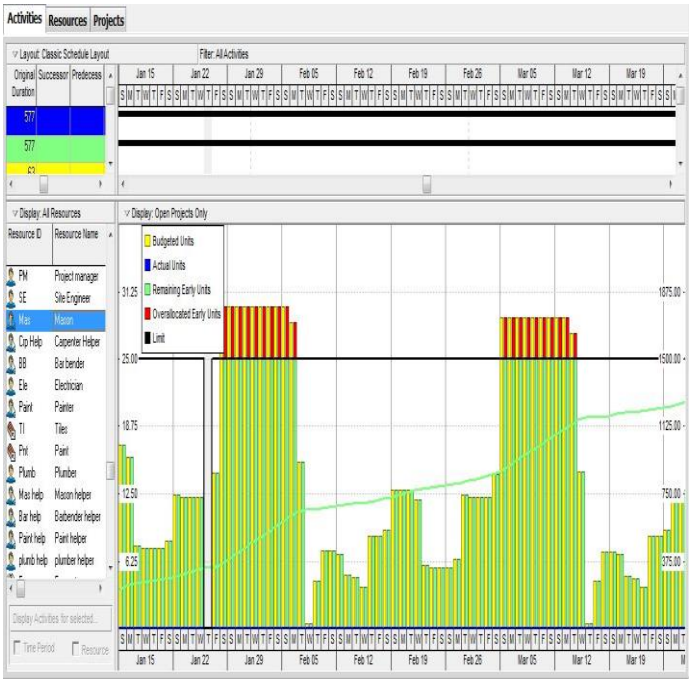

Fig.2 Above chart indicates over allocation of mason resource.

In above bar chart yellow color indicates budgeted units, green color indicates early units, red color indicates over allocated resource and black horizontal line indicates maximum limits of resource. Red vertical bar indicates over allocated mason. Above maximum limit of resource vertical bars shows over allocated resource.

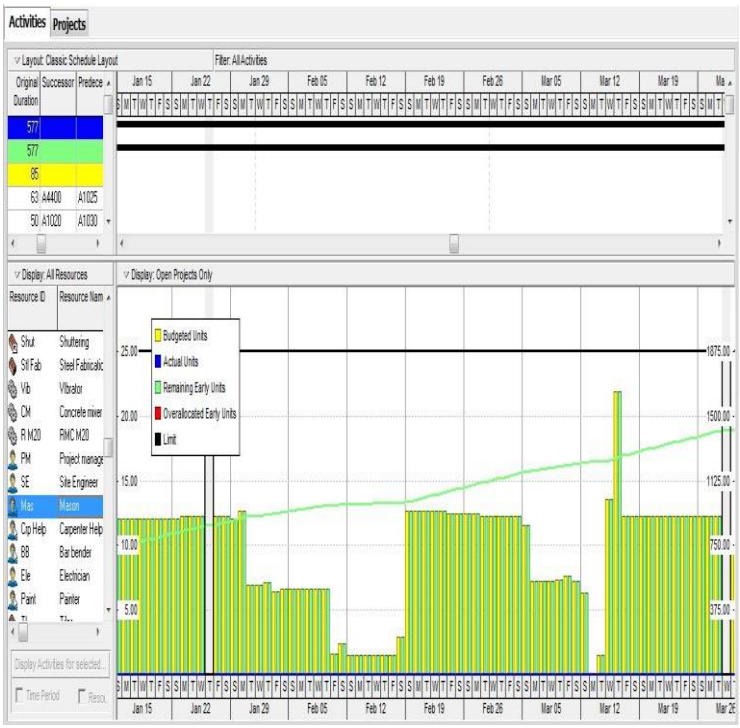

Fig.3 above chart indicates the mason resource after leveling

Above figure shows mason resource after optimization without increase the project duration.

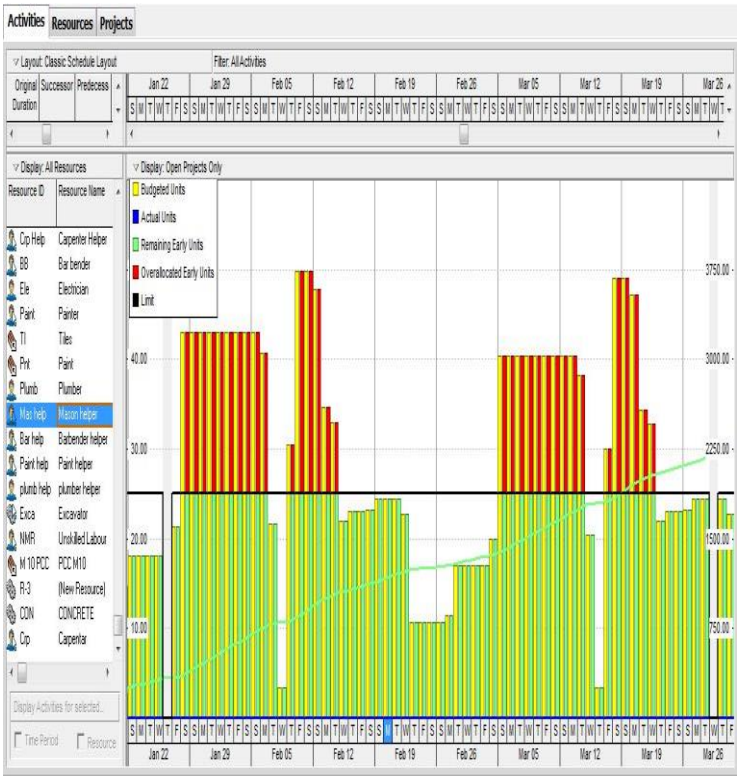

Fig 4 Bar chart indicates the over allocated of mason helper.

In above bar chart, blue color indicates the mason helper and red color indicates the over allocated of mason helper resource .black horizontal line indicates the maximum limit the mason helper resource. This can be optimized by leveling method and to save the cost which spent on the mason helper.

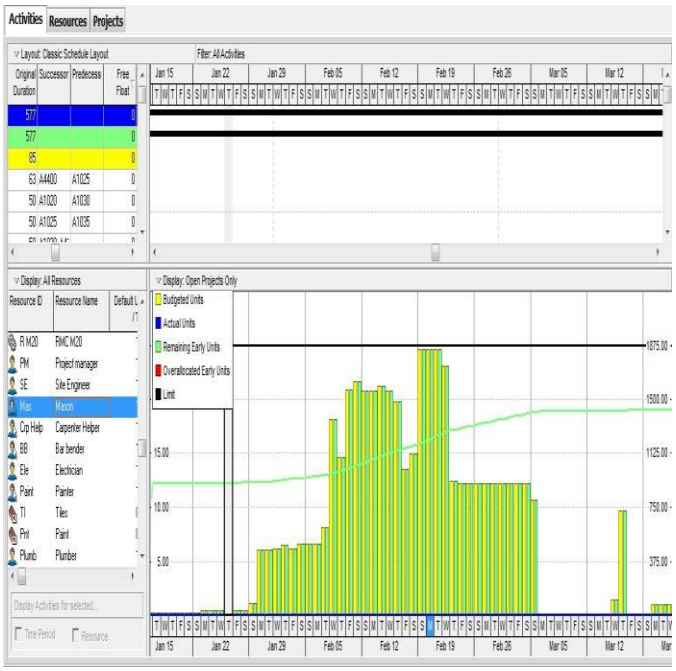

Fig.5 Bar chart indicates the optimized mason helper resource.

Above fig shows the mason helper resources leveled without increasing the project duration.

5. Conclusion

The objective of this study on resource used in the construction industry is to optimize or reduce or to avoid on wastages of the resource in construction project. Resource optimization has been done by using project management software like primavera p-6. here man power resource like mason, mason helper, carpenter , carpenter helper , painter, painter helper have been taken in to consideration for optimization because they are most commonly used resources were found as an over allocated resources for some activities. Hence optimization was done to this resource and by modifying predecessors without affecting the duration of the project. These resources were leveled in such way that their allocation is well within maximum availability.

This study concludes the following results.

- Man power resource like mason, mason helper, carpenter, carpenter helper, painter, and painter helper in this case study has been optimized. In such a way that they are not over allocated of any of the activities in the project.
- Over allocated resource are eliminated from the activities.
- Optimization can be done to all other resources which are used in construction project and can reduce the project cost.
- Optimization of the resource can be done without changing the project duration.

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