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APPLICATION OF MICROSOFT PROJECT FOR RESOURCE OPTIMIZATION IN MULTIPLE PROJECT MANAGEMENT

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Abstract - *The construction industry is one of the largest and the most job oriented industry in the world. Project management concepts and its applications have become very important factor for the success of any project. These concepts help in managing the time as well as optimize the cost of construction. Resource management is one of such concepts which helps to manage the resources which include man power as well as machineries effectively, which proves to be the important components of the project. Thus in this work an attempt has been made to apply resource management technique, using MSP a schedule is developed for execution of three residential buildings and total time and cost required for each individual project completion as well as total duration and cost for all the three project is obtained. Further a single schedule is developed for all the three projects and resources are simultaneously allocated and project cost and time are obtained and are compared with the earlier once.*

Key Words: MSP, Scheduling, Estimation, Multi project management.

1. INTRODUCTION

The construction industry is one of the largest and the most job oriented industry in the world. India is a developing country and construction industry in India contributes 11% to its GDP which contributes in the economic growth, it is our need to develop good infrastructure such as highways, flyovers, bridges, airports etc., for maintaining a continuous growth. Multi project requirements pose a different challenges when compared to a single project and high light challenges are encountered by the developers and contractors which operate in a multi project environment. Execution of multiple projects at a single point of time have different challenges with respect to resources allocation which includes both material management as well as labour management. In short there are considerable differences in the execution of a single project and multi projects which question the application of the commonly used project management techniques. This examination reveals to significant diminishment on volume of the fundamental assets and downright projects consumption.

1.2 OBJECTIVE OF THE STUDY

Microsoft project is used for planning scheduling for three projects considering a single project execution at one point of time. Further a cost and resource allocation model is developed considering all the three projects under a single umbrella (considered as Project 4 in further reference) and the resources are allocated simultaneously. The scheduling of the resources is done with a view of maximum utilization of available resources. Based on this, following objectives are set for this work:

1. To obtain total duration and cost of Project 1 using Microsoft Project.
2. To obtain total duration and cost of Project 2 using Microsoft Project.
3. To obtain total duration and cost of Project 3 using Microsoft Project.
4. To determine total duration and cost of all the three projects considered individually.
5. To obtain total duration and cost of Project 4 using Microsoft Project.
6. To compare total duration and cost as obtained in Objective 4 with that obtained in Objective 5.

2. LITRATURE REWIEW

The following are the past research survey based on which I have carried out my work.

AZAR IZMAILOV et.al. [1]. In this research, the author has done the comparison between the modern method and the old or traditional method, according to this study only 44% of the projects were completed within the given time by adopting the traditional method. In order to overcome this problem a comparison of modern technique (using critical chain project management method) and traditional technique was carried out and the results obtained from this study revealed that the use of modern techniques in projects leads to on time completion of the project

B. S. K. REDDY et.al. [2]. In this work the authors have described how the profitability or the performance of the project can be accelerated. According to them the performance of the project mainly depends on how the assets or the resources required for the projects are managed. They have also highlighted the importance of "Resource Allocation" and Resource Smoothening. In this study the authors have done the comparison of resource requirement for two ongoing projects in Dubai by different ways at first they calculated the requirement of the

resources if the projects were started with a lag time and later again the requirement of the resources were calculated by considering that both the projects are started simultaneously by doing this they found that by starting both the projects simultaneously there will be the reduction in resource requirement by 5.65%.

ALBERT PONSTEEN et.al. [3] When this work multi project resource management with respect to human resource and automated resource allocation is considered. This paper has identified two major parameters namely decision making and project scheduling further the author has diversified decision making criteria into centralized approach and decentralized approach and the scheduling is diversified with respect to human resources and automated resources. For scheduling, optimized algorithms are used. The author concludes that centralized decision making and use of automated resources helps in managing multiple projects in an efficient way.

RHUTA JOSHI et.al. [4] The main objective of this research is to minimize the duration of the project by applying various management techniques. The area of the interest is emphasized on resource constrained. Project management techniques by scheduling various construction activities, allocation of resource and resource levelling is analyzed by implementing Microsoft Project 2013 and a comparison between the time cost implication and scheduled time and estimated cost is done. It is thus concluded that resource scheduling reduces the loss of the project which is caused due to variation in the usage of the resources.

3. RESEARCH METHODOLOGY

3.1 GENERAL

Project management concepts and its applications have become very important factor for the success of any project. These concepts help in managing the time as well as optimize the cost of construction. Resource management is one of such concepts which helps to manage the resources which include man power as well labour effectively which prove to be important components of the project. Allocation of resources is an important parameter of resource management. Over allocation of resources leads to the over usage of the manpower which affects the budget of construction as the excess labour required have to paid more. In case of multi project execution resource management gains much more importance as the scale of work as well as the number of labours employed is quite high. Thus there is a need to work on the concepts of the resource management with special emphasis given to labour productivity and its management. Thus in this work an attempt has been made to apply resource management technique using MSP for the construction of the three residential buildings with a view of optimizing the total combined duration of all the three projects.

3.2 RESOURCE ALLOCATION

It is the technique of assigning the required number of resources (man power and material) for timely completion of any activity. The process of resource allocation should be such that neither the resources are over allocated nor under allocated. Over allocation of resources leads to the increase in the project cost whereas the under allocation leads to the delay of the project.

Resource optimization is a technique of resource allocation which assigns the optimal number of resources to each activity such that all the resources are completely utilized. Optimization results in reduction of idol time and increases the overall productivity.

In this work the resources are allocated such that there is a least idol time and optimum utilization of the resources is possible.

3.3 PROJECT DETAILS

In this work following three residential buildings are considered for analysis.

1. Project 1 – Residential building of ground and three storey with pent house.
2. Project 2 – Residential building of ground and first storey.
3. Project 3 – Residential building of ground and three storey with pent house.

In this work schedule is developed for execution of three residential buildings and total time required for each individual project completion as well as total duration for all the three project is obtained. Further a single schedule is developed for all the three projects, and resources are simultaneously allocated and project cost and time are obtained and are compared with the earlier once.

4 RESULTS AND DISCUSSIONS

4.1 GENERAL

In this study a detailed work on simultaneous resource allocation was done. The scheduled was planned such that all the available labours are fully utilized at every point of time with a view of finishing all the three projects together in a shorter duration the results of this study are summarized in this chapter.

- **PROJECT 1**

Total duration required for completion of Project 1 is 392 days.

Total cost required for completion of Project 1 is ₹ 1,24,15,063.

- **PROJECT 2**

Total duration required for completion of Project 2 is 263 days.

Total cost required for completion of Project 2 is ₹ 53,20,428.

- **PROJECT 3**

Total duration required for completion of Project 3 is 461 days.

Total cost required for completion of Project 3 is ₹ 1,76,41,763.

- **DURATION REQUIRED FOR COMPLETION OF ALL THE THREE PROJECTS.**

Total duration required for completion of Project is 1116 days.

Total cost required for completion of Project is ₹ 3,53,77,254.

- **PROJECT 4 (ALL THREE PROJECTS CONSIDERED AS A SINGLE PROJECT)**

Total duration required for completion of Project 4 is 835 days.

Total cost required for completion of Project is 4 ₹ 3,47,42,722.

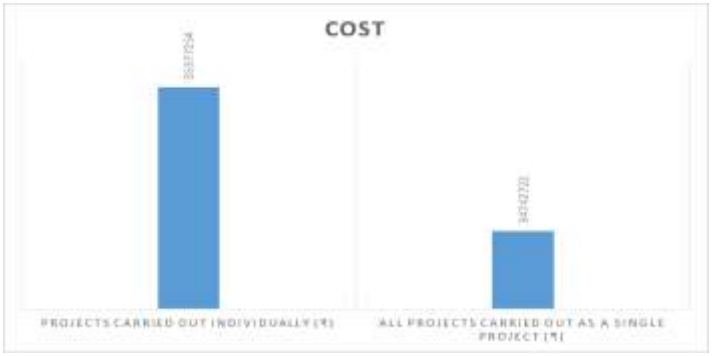

Fig. 4.1: Cost comparison.

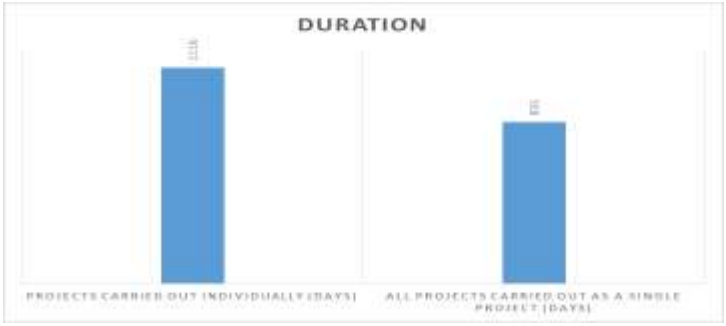

Fig. 4.2: Duration comparison.

5. Conclusion:

Following conclusions are drawn from this study

1. Total duration of **Project 1** is 392 days and the total cost is ₹ 1,24,15,063.
2. Total duration of **Project 2** is 263 days and the total cost ₹ 53,20,428.
3. Total duration of **Project 3** is 461 days and the total cost ₹ 1,76,41,763.
4. Total duration and cost of all the three projects considered individually is 1116 days and ₹ 3,53,77,254 respectively .
5. Total duration of **Project 4** is 835 days and the total cost is ₹ 3,47,42,722.
6. Comparing Conclusion 4 with Conclusion 5 we obtain
   i. Total duration required for completion of all the three projects can be reduced by 281 days which is 25.18%.
   ii. Total labour cost required for completion of all the three projects can be reduced by 6,34,532 which is 8.42%.

Thus this study helps in developing a frame work with respect to resource management with special emphasis for labour management. This provides a platform for labour management in a scenario of simultaneous execution of different projects. The application of Microsoft Project in this work helps in resources allocation as a result of which the total duration and cost of the project can be reduced.

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BIOGRAPHIES

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