Study of Resource Planning for Bridge Construction Project.

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Abstract - *Planning in the construction industry plays an important part in the successful outcome of a project. How a project task has to be dealt with is part of the engineers work load and it is in their responsibility to assure that this planned work is carried out on time and within its constraints. The Construction projects, especially the bridge construction projects, uses huge amount of resources on and off the field in various forms of resources viz. man, material, machine, money, time and space. A detailed study of resource planning can help in better monitoring and overall controlling of the project.*

Key Words*: *Planning, Resourceplanning, ProjectTask, Monitoring and Controll of the project.

1.INTRODUCTION

The infrastructure development is an important aspect for the overall development of the country. India is considered as the hub for service industry for which the infrastructure development plays an important role. Construction of Highway and Bridges is Major part of infrastructural development. The major issue observed on bridge construction site is improper planning of the resources. In bridge construction the same resources are used for different activities and the productivity of that resource being different for different activities. It is necessary to know the correct norms for correct estimation, planning, and monitoring.

1.1 Need of study

- Construction activity plays an important role in the economic development of any country. It accounts for 1% to 9% of gross national product and 10% to 60% of gross fixed capital investment. Construction is a larger activity with quality of resources usage increasing day by day.
- Today, construction projects are more complex than ever before. Thousand of tasks must be precisely controlled if a project is to run smoothly, on time, and in budget. The completion of a construction project requires the judicious scheduling and allocation of available resources. Manpower, equipment, and materials are important project resources that require close management attention. With this, Productivity measurement and improvement is definitely needed therefore the study of resource planning is needed.

1.2 Objectives

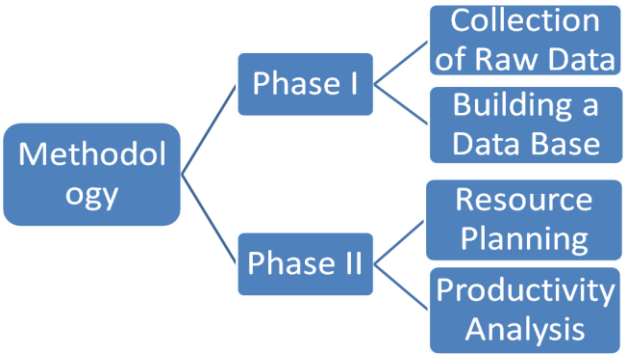
1. To study the different resources required for a Bridge project.
2. To categorize the usage of different resources according to their need in different item of work.
3. To build a data base of data collected from site.

1.3 Problem Statement

It is observed on site that, supply and availability of resources is always taken for granted because of seasonal shortages, labor disputes, equipment breakdowns, competing demands, delayed deliveries, and a host of associated uncertainties. This affects the timely completion of the project. If time schedules and cost budgets are to be met, the work must be supply with the necessary workers, equipment, and materials when and as they are needed on the job site.

Companies are not keeping and maintaining their real time record and not building a data base which is helpful for resource planning and productivity enhancing for the ongoing projects.

2. Methodology



This paper introduces a comprehensive framework for resource planning. This study is carried out in two phases. In the first phase, all the information and data needed to estimate resources were collected. In second phase, the actual resources available for the project are analyzed by Resource leveling with increased duration.

Planning **Man** power (work force) by structuring it into functional groups and workers team scheduling to match task requirements.

Next Construction **Materials** are planned by identifying materials required, estimating quantities, defining specifications, sample approval, and material inventory.

After this **Machine** (Construction Equipments) are planned by identifying the construction tasks to be undertaken by mechanical equipment, assessing the equipment required, exploring the equipment procurement and finally selecting the equipment.

Finally planning of **Money** (Construction Budget) is done. Which involves structuring of project functional organization into production, services and administration responsibility center, allocating resources with budgeted cost and finally compiling the project financial plan in the form of project master budget.

Resource planning

Planning Man power

The project man power planning primarily focuses on determining the size of project work force, its structuring into functional groups and workers teams, and scheduling the manpower recruitment to match the task requirement. This process chiefly involves identifying the trades or the skills required, establishing productivity standards to determine the number of worker needed to perform a given job in the specified time, data wise forecasting of workers requirements for accomplishing the project work and finally organizing the planned work force into operating work-teams having assigned programmed tasks.

Planning construction Materials

Efficient material management in project environments calls for an integrated approach covering numerous functions such as materials planning and programming, materials purchasing, inventory control, store-keeping and ware housing, materials transportation and handling at site, materials codification and standardization and the disposal of surpluses. The material planning and programming, which is the key function on materials management is closely linked with the project planning and control set-up. Both these work together to develop a plan to procurement and stocking of construction materials so as to provide at site, materials of right quantity, at right prices from right source and at the right time.

The construction material planning involves identifying the materials required, estimating quantities, defining specifications, forecasting requirements, locating resources for procurement, getting material samples approved, designing material inventory and developing procurement plan to ensure a smooth flow of materials till the connected construction work are completed at the project site.

Planning Construction Machinery

Production task needing equipment include excavating, handling, transporting, filling, compacting, grading, hoisting, concreting, pre-casting, plastering, finishing, trenching, and laying of pipes and cables. The supporting equipment at project site consists of generators, transmission lines, pumping sets, other utility services equipment.

Construction equipment is indispensable in execution of modern high-cost, time-bound massive construction projects. It produces output with an accelerated speed in a limited time. It saves manpower, which is becoming ever more costly and demanding. It improves productivity, quality and safety and also adds a sense of urgency. Acquisition of equipment mass involves initial heavy investment but, on the whole, its ads to profitability by reducing the overall costs, provided it is properly planned, economically procured and effectively managed.

Equipment planning for a project aims at identifying construction task to be undertaken by mechanical equipment, assessing the equipment required, exploring the equipment procurement options and finally, participating in the decision making for selecting the equipment.

Bridge construction : methodes and machineries

Components of Bridge

The components of bridge can be broadly categorized into two types according to their functional performance and material and technology used.

Sub Structure

The substructure of bridge consists of foundation of the bridge. Foundation is associated with huge earth work, soil stabilization, and concreting.

Super Structure

The super structure of the bridge consists of Pier, Abutment, Girder, Slab And Railing. Construction of super structure is associated with RCC work, Concreting ,and massive earth work for Backfilling.

Classification of Bridges

According to materials of construction

i) Cement concrete,

ii) Masonry,

iii) Steel or Timber bridges.

According to Function

i) Road Bridge

ii) Railway Bridge

iii) Pipe-Line Bridge

According to length of span

i) Culvert- Upto 6m

ii) Minor Bridge- 6m to 30m

iii) Major Bridge- Over 30m

Equipments used in Bridge Construction

Excation

The excavation equipment commonly used in bridge construction includes bulldozers, scrapers, shovels, hoes, JCB, and draglines. Bulldozers and scrapers may be used for shallow excavation work and for hauling the earth for relatively short distances.

RMC plant

The RMC plant is a very important machinery required for construction of the bridge. Capacity of the mixing plant greatly affects the progress of the project.

Transportation of materials

Different types of materials are needed to be transported from one place to another place. Trucks/ Dumpers/ Tippers/ Transit Mixers are used for transportation.

3. CONCLUSION

In the present globalize business scenario, Indian construction companies have also started facing stiff competition from foreign competitors. In this situation even the big companies have to access their own strength and weakness according to situation. In order to assess their capabilities for utilization of resources and track their productivity status, the first step should be to keep and maintain their real time record and build a data base from the ongoing projects. Next step is to analyze the data and find out the productivity of resources, and compared them with expected/ budgeted norms and improvement as applicable.

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