

## Resource availability and planning in bridge construction Project

Ahirrao Kiran Ramchandra

*P.G. Student MVP's KBTCOE, Nashik*

Mrs. Madhura C. Aher.

*Asst. Prof. Civil Department MVP's KBTCOE, Nashik*

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**ABSTRACT:** The Construction projects, especially the bridge construction projects, uses huge amount of resources on and off the field in various forms of resources viz., materials, plants, equipments and human resources along with money, time and space.

and overall controlling of the project. In highway projects, the same resource is often used for different activities and the productivity of that resource being different for different activities, it becomes inevitable to know the correct norms for correct estimation, planning and monitoring.

The main objective of this thesis work was to planning the main resources and measure the productivity of the resources (i.e. the equipments, plants and manpower) deployed at a bridge project; finding out the factors affecting the productivity of these resources; establishing the change of trends due to seasonal variation and finally establishing an estimated range of productivity of the resources in different environmental and site conditions.

**KEYWORDS:** *Resource availability, Planning, bridge construction.*

### I. INTRODUCTION

The research work was initiated by reviewing available relevant literatures, journals and previous research works about the productivity at construction projects as well as the contemporary technologies and practices used in the bridge projects. It has been found during the study that the present day practices of bridge construction are highly mechanized due to time and quality constraints. Equipments and plants, thus, play the most roles in the bridge construction process. So, this research mainly concentrated on equipment planning and productivity along with construction materials, manpower with different performance measurement. Then studies were carried out in one bridge project site and data related to the

planning, performance, production and cost of production of different plants, equipments, material and manpower were collected and collated for analysis. The data regarding the plants and equipments were mainly analysed on the basis of their availability, utility, performance productivity, uniqueness of the project, rate, cost components and seasonal variations.

### II. 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.

### III. 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.

#### IV. Objectives

1. To study of planning resources in different conditions.
2. To study how proper resource planning and productivity analysis (of any one item) helps in cost controlling.
3. To study which factors affect the planning and productivity of resources.

#### V. Importance of the Study

The supply and availability of resources can seldom be taken for granted because of seasonal shortages, labour disputes, equipment breakdowns, competing demands, delayed deliveries, and a host of associated uncertainties. Nevertheless, 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. The basic importance of study resource planning is to supply and support the field operations so that established time objectives can be met and costs can be kept within the construction budget. Therefore study of resource planning help the organization to achieve its goal.

## II. METHODOLOGY

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.

### 3. Bridge Technology: Methods And Machineries

#### 3.1 INTRODUCTION

This chapter is completely devoted to the detailed study of various types of bridges, their components, construction methodologies and the major machineries used in normal conditions. All the major structural components of the bridge have

been discussed over different categories of bridge and the complete list of machineries used.

#### 3.4 BRIDGE CONSTRUCTION EQUIPMENTS

Each of the activity of construction of bridge requires specific types of equipments to perform. Nowadays, the construction of highway has become equipment oriented rather than being a labour oriented job like before. Modern equipments backed by state-of-the-art plants and sophisticated technologies lead the industry today. The major activities along with the required activities are listed below.

##### 3.4.1 Excavation

Excavation is the process of cutting or loosening and removing earth including rock from its original position, transporting and dumping it as a fill or spoil bank. The excavation or cutting may be needed in soil, soft rock or even hard rock, before preparing the sub grade. The depth of cutting decided, among other factors, on the requirement of vertical profile of the road.

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

Bulldozers are considered to be a versatile machine for many construction projects as it may be used for clearing of site, opening pilot roads, moving earth for short haul distance of about 100 meters and also in several other jobs.

Scraper is considered as one of the useful earth moving equipment, as it is self operating it can dig, haul and discharge the material in uniformly thick layers; however scrapers are not capable of digging stiff material.

Power shovel is used primarily to excavate earth of all classes except rock and to load in to dumper. Power shovels may be crawler mounted, which move at low speeds.

Hoe is an excavating equipment of the power shovel family. Hoe is meant to excavate below the natural surface where the machine is stationed and is capable of having precise control of depth at close range work. Hoe can precisely control the depth at close range work. They can exert high tooth pressure and hence can excavate stiff material and hence can excavate stiff material, which normally cannot be excavated.

### III. CRITICALITY OF MANAGEMENT REQUIREMENT

Large outlays of money are involved in securing construction equipment and such expenditure needs to be justified by way of return on investment while executing the projects. The modern principles of management are required to be meticulously applied to all aspects of construction equipment, including selection, procurement, storage and maintenance. The productivity levels of various items of construction equipment have to be carefully assessed to take full advantage of the productive potential during the use of construction equipment. The utilization has to be carefully planned so that idle time is kept to the minimum preventive maintenance and repair facilities have to be considered and necessary infrastructure facilities included in the planning processes. Any under utilization of construction equipment will result in losses to the construction agencies. Considering the factors, the need for scientific management of construction equipment is obvious.

Financial planning shall be based on or may dictate the mode of making the equipment available. Agencies involved in construction as a continuing activity investment. Advances from clients, supplemented by loans from financial usage for limited periods or non-repetitive activities equipment may be hired.

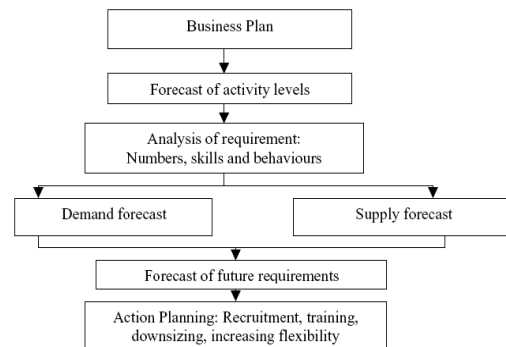
### IV. MANPOWER PLANNING

Manpower planning is of great important in the general development and growth of organizations. Construction Industry involves in its vicinity a diverse labor force, contributing towards the long and enduring —Process of Creation. Development is today the first priority of every nation. Infrastructure development in particular is indispensable for an economy's development, so is manpower for construction for infrastructure building companies. Highly skilled and experienced employees in construction sector are always difficult to acquire at short notice. It's not just technical talent and soft skills that is

yardstick for recruitment process, we should also take into account candidate's work records and certain personal attributes to guarantee a long-term association between the employee and the employer. Yet, it is least lucrative profession for many as it involves peripatetic work schedule, along with it job insecurity associated with poor working conditions, health and safety records and employee welfare provisions within the industry.

The main reason behind the Construction Industry to be poorly regarded is generally

thought to stem from the nature of the work and the terms on which the labor is recruited. The construction Industry in number of countries has also been characterized by the outsourcing of labor through sub contractors and other intermediaries that prohibits them from taking the advantage of employment schemes. The construction industry lagged behind other industries in development and in application of labor saving ideas and in finding several measures to substitute equipment for labor. The casual nature of the employment in the construction Industry makes planning a vague exercise. The construction industry is one of the largest sectors employing large number of people, providing work to significant proportion of the labor market and providing significant share of the world Gross Domestic Product (GDP). Any construction project involves skilled manual labor which gets support from management. It is a duty of the management to coordinate many professional, construction and supplier organizations whose involvement can change through the course of the project. The dynamism that involves in the process and the need to integrate a wide range of occupational cultures, gives the construction one of the most complex project related Industry in which there is a need to apply good Resource Management practices.



### V. 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.

The plant and machinery department of company needs to use the equipments as per the chalked line out plan. The manager should have proper control over material inventory, procurement and order of same must be placed after calculating quantity.

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