

# Assessment of Equipment Management in Four Lane Highway: A Case Study of Latur

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**Abstract:** Construction equipment is a major resource in the building process for a construction project. When equipment is owned by a contractor, it forms a sizable portion of his assets requiring proper management practices. Selection of construction Equipment plays very crucial role in effective completion of any civil project. Thus selection and planning of equipment is essential for the utilization with minimum cost. It is an engineer's responsibility to assign a particular equipment to complete a task as per site conditions. As there are large number of equipment's available in the market it becomes a difficult task to select the equipment depending upon its productivity & other responsible factors. This thesis is to Study the highway construction site for current practices of equipment management and to present the most popular practices of the contractors and to compare the equipment management policies with a Case study of a Latur.

**Keywords:** Equipment management, Proper planning, Proper utilization.

## 1. Introduction

To function any project in smooth manner it is essential that an engineer should have a detailed knowledge about the equipment available and to direct it on a particular task. The overall progress of the project depends upon how fast the work is carried out. Hence it becomes a necessity to select the equipment by considering all aspects of working conditions of site. So it is necessary to make the proper planning & management of equipment's available to use it in an effective manner at minimum possible cost and with maximum output productivity.

The main aspect of this research paper is to focus upon the selection of various equipment available in the market and their planning for an appropriate task. The construction equipment's can be classified as Vertical moving equipment Horizontal moving equipment Hand held equipment Personal protective equipment concreting equipment inspection equipment Surveying equipment. In order to select the equipment from the above categories it becomes a crucial task to select an appropriate equipment at minimum possible cost. We also have to consider the working conditions and availability of trained manpower to operate the equipment's. Also the performance of equipment selected is to be measured on basis of various factors like fuel consumption, productivity of equipment per hour, & hiring cost if an equipment.

The equipment's can be selected on the basis of categories they are needed for. For selecting equipment for excavation we need to search for the equipment's depending upon the site conditions, duration of work for which equipment is required and its overall cost. While selecting an excavation equipment it becomes essential to prioritize the main course for which machine is required as like for block excavation, for piling, etc. while selecting equipment there must be a past experience about the selection of machineries so as to avoid any errors and issues on site. Selection of equipment's governs the quality of executing the work. Thus whole decision is pending to the senior authority to assign the equipment on site for a particular task. After studying every technical and economical aspect the equipment is selected. Also the limited time duration of project forces us to work with high speed equipment's thus thereby increasing overall cost of project.

## A. Objective

1. To study the Equipment used for highway project,
2. To determine the main causes of equipment planning and management problems,
3. To determine the effects due to poor equipment planning and management problems.
4. To recommend possible equipment planning and management methods.

## 2. Literature survey

*Y. R. Anbhule*, Effective management of equipment is crucial for the success of construction firms. Inadequate manual processes of equipment management and the subjective decisions of equipment managers usually result in major losses in construction firms, hence, the economy. Highway construction projects are the yardstick to measure the development of country. Now the highway construction projects are changing their face. Due to "Public Private Participation" in highway projects, it has become a challenging job to complete the project in stipulated time. 3D equipment management system deals with Proper planning, selection and optimum utilization of construction equipment for highway construction project.

*Prajeesh. V. P.*, Construction equipment is a major resource in the building process for a construction project. When

equipment is owned by a contractor, it forms a sizable portion of his assets requiring proper management practices. Good project management in construction must vigorously pursue the efficient utilization of labor, material and equipment. The use of new equipment and innovative methods has made possible wholesale changes in construction technologies in recent decades. The selection of the appropriate type and size of construction equipment often affects the required amount of time and effort and thus the job-site productivity of a project. It is therefore important for site managers and construction planners to be familiar with the characteristics of the major types of equipment most commonly used in construction. This thesis is to study the management of equipment's practices in Construction Industry and to present the most popular practices of the contractors and to compare the equipment management policies with a Case study of a construction industry. The needed data were collected via a structured questionnaire. The contractors were divided into three grades based on their annual work volumes. The collected data were analyzed using the SPSS software. The elements of the management policies were cross-tabulated against the grades of contractors for finding possible significant differences in contractors' practices. Hypotheses on some expected results were tested. Finally, the findings of this study were compared with findings of questionnaire conducted for finding significant commonalities and differences in equipment management practices.

*Kartik Sharad Thete*, Selection of construction equipment plays very crucial role in effective completion of any civil project. Thus selection and planning of equipment is essential for the utilization with minimum cost. It is an engineer's responsibility to assign a particular equipment to complete a task as per site conditions. As there are large numbers of equipment's available in the market it becomes a difficult task to select the equipment depending upon its productivity & other responsible factors. Many of the construction firms are unaware of the new construction equipment available in The market. To complete the project within a stipulated time use of equipment's becomes a priority. Thus the equipment's should be well classified so as to reduce their selection time. The objective of this paper is to deal with classification, selection & utilization of all construction equipment's to ease the method of selection & timely completion of project.

*Ibrahim Mahamid*, the construction industry is one of the main sectors that provide important ingredients for the development of an economy. However, many projects experience extensive delays and thereby exceed initial time and cost estimates. Construction delay is considered to be one of the most recurring problems in the construction industry and it has an adverse effect on project success in terms of time, cost, quality, and safety. This study is conducted to investigate the time performance of road construction projects in the West Bank in Palestine to identify the causes of delay and their severity according to contractors and consultants through a questionnaire survey. The field survey included 34 contractors

and 30 consultants. A total of 52 causes of delay were identified during the research. The survey concluded that the top five severe delay causes are political situation, segmentation of the West Bank and limited movement between areas, award project to lowest bid price, progress payment delay by owner, and shortage of equipment

*Saurabh Rajendra Kadam*, Large numbers of construction equipment are required on construction site. The efforts of contractors are to constantly push machine capabilities forward. As the array of useful equipment expand, the importance of careful planning and execution of construction equipment's increases. The objective of the project is to predict the fleet production rate and to optimize the number and size of equipment's in the fleet to match the equipment to project situations. Equipment economics is taken into consideration for the optimization.

*Samson Mekbib Atnaw*, the major share of capital and equipment intensive operation goes to the road sector and the hydro – electric power projects. The construction sector in Ethiopia is developing at a fast rate and its capital budget is increasing from year to year. One of the reasons for this high growth is the number of new construction projects underway and those in the pipeline. In addition, the hydro-electric power projects the government has given a great emphasis to increase the current installed power of 780Mw to a total of 10,000Mw in the coming few years. These hydro-power projects are known for using a great deal of high investment heavy machineries. Therefore, the construction equipment management plays a great role in finalizing the projects with fewer budgets and no time over run. Considering the higher operation, maintenance and investment cost of construction equipment, it is important to have a carefully optimized decision making model that will help in the sizing and selection of the right combination of equipment for a given project. Even the rental versus purchase evaluation needs careful consideration of the project requirement and its duration. This study tries to analyze the existing situation taking a selected company as a case study with regard to construction equipment management. The study tries to cover the equipment management policy of the company, suppliers/manufacturers evaluation and selection criteria, types of purchase processes employed, as well as different make types and capacities of equipment owned by the company. Moreover, capacities of standard facilities available for the central maintenance workshop and replacement plan of equipment of the company in the coming five years will be investigated and commented on.

*M. Manikandan Construction*, Equipment is the important factor to run the project in a successful manner. This paper elevated on benefits of implementing total Productivity. While purchasing, leasing or renting the equipment, and guide in optimizing the profitability. Methods of life cycle cost estimating and decision methods were researched and compared. Maintenance and it will also focusing on calculating

the overall equipment effectiveness. Utilization of machine properly and match their capacities to specific project requirements. Current practices and observations made in Indian construction industry. The effectiveness of construction machineries is a major factor that differentiates construction companies in terms of heavy construction and light construction. The time and cost of project is most important constraint for the success of project. Data was acquired from equipment rental companies, construction companies and multiple construction projects. Hypotheses on some expected results were tested. Finally, the findings of this study were compared with findings of questionnaire conducted for finding significant commonalities and differences in equipment management practices. Maximizing the equipment effectiveness 81.5% of a production system. The objective of the work is to enhance the equipment effectiveness at a construction company. This research work revealed different factors of machinery management. Factors causing cost overrun in the construction projects were ranked on the basis of Relative Importance Index (RII). Top five significant factors identified were frequent equipment breakdowns, maintenance of equipment, insufficient number of equipment, performance and efficiency of equipment and inadequate modern equipment systems.

### 3. Conclusion

This paper focuses only on the literature review of previously published studies. The findings of this study were compared with findings of questionnaire conducted for finding significant

commonalities and differences in equipment management practices. Maximizing the equipment effectiveness 81.5% of a production system. This study tries to analyze the existing situation taking a selected company as a case study with regard to construction equipment management. The study tries to cover the equipment management policy of the company, suppliers/manufacturers evaluation and selection criteria, types of purchase processes employed, as well as different make types and capacities of equipment owned by the company. The effectiveness of construction machineries is a major factor that differentiates construction companies in terms of heavy construction and light construction.

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