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REVIEW ON FLEET MANAGEMENT OF HIGHWAY CONSTRUCTION EQUIPMENTS

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ABSTRACT

Construction industry rapidly increases day by day for the smooth operation of construction activity number of construction equipment is required on construction sites .The construction equipment's are high in rate their purchase capital in largely consumed the money of any construction company . Therefore their the productivity plays very valuable role because it affect the benefit margin of company .also the effective control on operating cost is required For this effective equipment management is successfully implemented on site As the array of useful equipment expand, the importance of careful planning and operation 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 account for the optimization. Observation is done on the actual ongoing highway construction project and the analysis of excavation and asphalt laying process is done. Fleet achievement of practiced fleet is compared with optimized fleet against equipment idle period per cycle,cost and productiveness.

KEYWORDS: Construction Equipment, Fleet Management.

I. INTRODUCTION

Project management in construction need sincerely seek the systematic utilization of material, labor and equipment. The use of equipment and creative methods has made possible major modification in construction technologies in recent decades. The choosing of the suitable class and size of construction equipment frequently influences the necessary duration of time and exertion and thus the job-site productiveness of a project. It is therefore essential for managers and execution planners to be well-known with the typical features of the major types of equipment most generally used in construction.

Today, we live and work in structure made of modernized materials and use modernized transportation service to move from one point to another. Highways, roads, and airports and harbor with terminals have been build up to ideal transportation. The administration has also built other essential infrastructures such as hospitals, and utilities.

Loading and hauling the earth are among the bigger operations in earthworks. In many instances, these operations are accomplished by a loading unit and several trucks. The natural inclination in planning an earthmoving activity is often to try to use equipment already on hand. This may give satisfactory results, especially in small projects. However, in planning a major project, a accurate choice of equipment fleet can result in considerable savings in both time and cost.

II. LITERATUTR REVIEW

Amir Tavakoli, Johannes J. Masehiand Cynthia S. Collyard have created database of equipment management system named FLEET. FLEET consist of four modules 1.)Inventory management module 2.)Cost, time and production module 3.)Maintenance management module 4.) Report generator module. They conducted a survey of top construction firms for the grasp of facts and figures.

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In first module they said equipment inventory data contains nine fields such as equipment number, description, date of manufacture, manufacture, purchase date, price, life, market value, custodian. In second module how to keep records of cost, time and production is given in a table with examples. In third module they describes how to save money and get profit by proper maintenance of equipment. There are two types of files maintenance management module i.e. preventive maintenance file and maintenance history files.

Er.Roshan H.Bhoye, Prof.P.M.Attarde performed benefit analysis. for that they compared actual and theoretically optimized fleet performance. Different factors of selection of equipments are summarized. They described various points such as planning of equipment, risk management, requirements of management, management practices and downtime and maintenance and repair. The system presented is a adaptable and practice-based system and is designed to display the accessibility of the database management systems. Development, compliance, and steady use of such methods should strengthen to the productivity and benefits of contractors. FLEET provides this efficient as a base to good management practices and policies. More research work is still required in this field, so great scope of research is accessible for new researchers in this field.

Bhagyesh J. Chaudhari1, Prof. S. C. Tandale2, Prof. S. S. Deshmukh . taken case study of NH50 sinner to nashik road which is 4 laying project. They described various factors related to equipment management i.e. economics of equipment, ownership cost, operating cost, production analysis etc. also they have calculated productivity of Excavator, Tipper, Dozer and Roller. They did fleet optimization and cost comparison. They concluded as the optimized fleet gives more productivity than current fleet employed at site. Cost comparison shows the 50% reduction in the cost of excavation for optimized fleet than current fleet. This paper tries to shows how productivity and profit optimization of these equipments can be accomplished. To perform these optimization production capacity and cost of equipments, idle period is taken into consideration. To validate the results, case study of NH50 is taken and it is found that there is increase in profit.

Rahul Patil This study will involve different methods for enumerating the productivity of a segment of equipment. By using the idea of sustained cycle time which will help in forecasting to refund for the hidden disturbance that may occur in a typical equipment manufacturing cycle. The variance between the maintained and synchronous cycle could be studied and the unstable nature of equipment production systems could be understood using stochastic types for forecasting productivity.

Aniket s gokhale. taken case study of construction of 4 laning of Kolhapur-Sangli road(NH166). He studied three activity listed below. He worked on cost comparison of equipment for these three activity separately by taking two trials for each activity. Based on the data observed from planning program the bar charts are prepared for service road and main transit way construction. Major activities cited are as follows: 1) Clearing and Grubbing Activity. 2) Earthwork in Excavation and filling Activity. 3) Earthwork in Sub grade construction. For every exercise listed above the trials combinations of equipment as per availability are performed. For clearing and grubbing activity comparison between two trial combinations of equipment is done. In first trial combination one excavator loader (TATA TH 76) and three dumpers (TATA) is considered and in second combination one excavator loader (CAT) and three dumpers (TATA) is considered. After calculating the 'hourly operation cost of both combinations it is noted that nearly 16% cost is saved when the first combination is adopted.

Mohamed Marzouk and Osama Moselhi presented a structure for optimizing earthmoving operations using computer clone and genetic algorithm. It provides a multiobjective optimization tool to minimize time and cost of earthmoving operations. The optimization method uses a currently developed algorithm which considers a set of qualitative and quantitative variables that influences the production of earthmoving operations.

SaeedKarshenas: focused on truck capacity selection for earthmoving. Loading and hauling the earth are among the major operations in earth- works. In many instances, these operations are performed by a loading unit and several trucks. The natural tendency in planning an earthmoving operation is often to attempt to use equipment already on hand. This may give satisfactory results, especially in small projects. However, in planning a major project, a careful selection of equipment fleet can result in substantial savings in both time and cost.

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ThanapanPrasertunganian and B.H.W Hadikasumo quantified the factors that influence downtime result of highway construction equipment based on structural equation modeling. They divided methodology in two parts first is data collection and second is data analysis. six types of feedback systems and six subsystems are explained. The project they selected was a highway construction projects in Thailand. The SEM model so developed provides a skeleton for detecting the causes and consequences of downtime and recommend equipment maintenance as a proper equipment management practice

Y.R.Anbhule and Prof. M.B.Kumthekar proposed a conceptual design of 3D
equipment management system for highway construction projects. The concept of 3D equipment management system related with proper planning, selection and optimum utilization of construction equipment. They also described the use of current information technology solutions for equipment management.

III. CONCLUSION

The goal of fleet management policy is to set up optimization of equipments and maximization of profits. And this can be achieved by proper planning and management.

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