

TO STUDY VARIOUS CONSTRUCTION EQUIPMENT USED IN METRO PROJECT

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Abstract - The cost of equipment in a project varies from 10 to 30% of the total cost of the project depending upon the extent of mechanization proper planning, selection, procurement, installation, operation, maintenance and equipment replacement policy plays an important role in equipment management for successful completion of the project. with the growing use of machinery, it has become necessary for construction engineers to be thoroughly familiar with the working application and upkeep of the wide range of the modern equipment. The role of construction equipment in road, highways, large buildings, dams, canals, airways and power houses etc. continues to grow steadily. Proper emphasis should be on "reduce down-time, achieve optimum equipment utilization and increase production at minimum cost.

Key Words: Equipment¹, Operation², Machinery³, Modern⁴, Optimum⁵

1. INTRODUCTION

A metro rail is just one solution that is related to the size of the city's population. There is a popular perception that towns with less than a five-lakh population do not merit a metro. In construction of metro rail, heavy machineries are being used for underground and elevated routes. For creating underground space, the tunnel boring machine that has been developed in recent years, has provided a solution to the tunneling work.

Metro construction requires a lot of manpower and time, so to reduce the manpower and the time of the project machineries are used.

In Pune Pile foundation is used, and the types of pile foundation are end bearing and friction piles. Names of equipment for piling are, Rig (drilling machine), JCB's and Loaders for excavation.

There are three types of structures Substructure, Superstructure and Elevated structure. The machines that are used for lifting purposes in superstructure are Hydra, Tyre Mount Crane and Cravel Mountain Crane. The machines that are used for elevated structures Launching Girders and GLS (Ground Launching

System).

The machines that are used for concreting purposes are Concrete Pump (Old Method), Boom Placer (New Method) and Transit Mixer. The machines that are used for breaking purposes are Jack Hammer, Excavator with Breaker.

2. EQUIPMENT

2.1 BULL DOZER

Bulldozers are the most important equipment of construction project. Bulldozers are primarily used for cutting and pushing the material over short distances. It is equipped with front mounted blade, controlled by hydraulic cylinders to vary the depth of cut and rate of levelling depending on the material and application.



Fig.1

2.2 HYDRAULIC CRANE

Hydraulic cranes are usually truck-mounted cranes. All operations of these cranes are hydraulically powered including extension and retraction of out-riggers, extension and shortening of boom. The hydraulic power is supplied through oil pressure, generated by rotary oil pumps. Since ground contact of most cranes is longer than its width, they have greater stability in front and rear.



Fig. No. 2

2.3 BUCKET DRILLING

In Bucket drilling the bucket is rotated to allow the bottom of cutting teeth to collect the sample. When bucket gets full by sample then it is lifted with the help of cable. Flaps at bottom are closed to keep the soil inside the bucket and bottom of the bucket, is opened to allow the soil to dump. This is process is further carried out at different spots within nearby locations to test the sample obtained.



Fig. No. 3

3. OBSERVATION TABLE OF EXAVATION EQUIPMENT FOR PUNE METRO

S.no.	Equipment	Soil	Strata	Engine	Digging Depth (m)
1.	Hydraulic Excavator	Clayey soil	Hard strata	68 HP	4.5-6.5
2.	Rig Pile	Clayey soil	Hard strata	325HP	40-60
3.	Bulldozer	Clayey soil	Hard strata	290 HP	1.5-2.5

Table No. 1

4. CONCLUSION

Project connected with the construction of metro involve large magnitude of earth work and handling of millions of cubic meters of rock earth. These tasks require development of large fleets of construction equipment which are becoming very expensive. Efficiency of these equipment is crucial factor in completion of project in time and cost reduction. The task of managing construction project requires specific managerial as well as technical skills and experiences.

5. FUTURE SCOPE

The optimum Utilization could be further improved by considering the cost factor and labor factor to prevent excessive activities that could affect the time factor.

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