

CONSTRUCTION EQUIPMENT AND ITS USES

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Abstract : Today contractors undertake many types of construction activities that require different types, sizes, and groupings of equipment for earth moving, excavating, and lifting. There is a piece of equipment for practically any work activity, large or small. Construction equipment today is specifically designed by the manufacturer to perform certain mechanical operations that accomplish a work activity. Working capacity is a direct function of the size of the machine and the power of the motor. These simple relationships exist the larger the machine, the more power required for the operation, the greater the production capacity, and the greater is the cost to own and operate.

1.1. INTRODUCTION

The management of heavy construction equipment is a difficult task. equipment managers are often called upon to make complex economic decisions involving the machines in their charge. the equipment manager must also be able to forecast internal rental rates for their machinery.

We define terms associated with maintenance management efforts. We should apply these terms in all aspects of maintenance and capital improvement programs from budget planning and development to budget execution and financial reporting. the documents deferred maintenance, construction, capital improvement, and equipment needs to aid management in planning and budgeting for service field activities. as such, we manage it to provide timely and accurate information to the department and others. The cost of equipment in a project varies from 10-30% of the total cost of project, depending upon the extent of mechanisation. proper planning, selection, procurement, installation, operation, maintenance and equipment replacement policy plays an important role in equipment management for successful completion of project.

1.2 CONSTRUCTION EQUIPMENTS

The basic operations involved in the construction of dam Project are excavation, digging of large quantities of earth, moving them to fairly long distances, placement, compacting, leveling, dozing, grading, hauling, etc. construction equipment can be classified as under:

Table No-1

S.No	Particulars	Mileage
1.	Surveying Equipment	
2.	Earth Excavator	3 lit /hr
3.	Tipper (Dumper Truck)	2.30 lit/km
4.	Dozer Equipment	25 lit/Hr
5.	Vibratory Roller	1.5 lit-Hr
8.	Lifting Equipment	2.5 lit/hr
9	Concrete Mixer	1.25 lit/hr
10	Concrete Mixer Truck	2.5 lit/hr
11	Concrete Vibrator	0.5 to 0.8 lit/hr

1.3 DETAILS OF CONSTRUCTION EQUIPMENTS

1.3.1 EARTH EXCAVATORS

Excavators are heavy equipment consisting of a boom, bucket and cab on a rotating platform (known as the "house"). the house sits atop an under carriage with tracks or wheels. All movement and functions of the excavator are accomplished through the use of hydraulic fluid, be it with rams or motors.

Types Of Excavator:

- Compact Excavator
- Crawler Excavator
- Wheeled Excavators
- Backhoe Loader
- Dragline Excavator
- Bucket Wheel Excavator
- Long Reach Excavator
- Digging of trenches, holes and foundations
- Material handling
- Brush cutting with hydraulic attachments
- Forestry work
- Demolition
- General grading
- Heavy lift, e.g. lifting and placing of pipes

- Mining, especially, but not only open-pit mining
- River dredging
- Driving piles, in conjunction with a Pile Driver

3.1.2 Compact Excavator

- A compact or mini excavator is tracked or wheeled vehicle with an approximate operating weight from 0.7 to 7.5 tons. It generally includes a standard backfill blade and features independent boom swing.
- Hydraulic Excavators are somewhat different from other construction equipment in that all movement and functions of the machine are accomplished through the transfer of hydraulic fluid. The compact excavator's work group and blade are activated by hydraulic fluid acting upon hydraulic cylinders. The excavator's slew (rotation) and travel functions are also activated by hydraulic fluid powering hydraulic motors.



3.1.3 Backhoe loader

Backhoe loader, also called a loader backhoe and commonly shortened to backhoe, is a heavy equipment vehicle that consists of a tractor fitted with a shovel/bucket on the front and a small backhoe on the back. Due to its (relatively) small size and versatility, backhoe loaders are very common in urban engineering and small construction projects (such as building a small house, fixing urban roads, etc).



DRAGLINE EXCAVATOR

Dragline Excavation Systems are heavy equipment used in civil engineering and surface mining. In civil engineering the smaller types are used for road and port construction. The larger types are used in strip-mining operations to move overburden above coal, and for tar-sand mining. Draglines are amongst the largest mobile equipment ever built on land, and weigh approximately of 2000 metric tons, though specimens weighing up to 13,000 metric tons have also been constructed.

A dragline bucket system consists of a large bucket which is suspended from a boom (a large truss-like structure) with wire ropes. The bucket is maneuvered by means of a number of ropes and chains. The hoist rope, powered by large diesel or electric motors, supports the bucket and hoist-coupler assembly from the boom. The dragrope is used to draw the bucket assembly horizontally. By skillful maneuver of the hoist and the dragropes the bucket is controlled for various operations. A schematic of a large dragline bucket system is shown below. A power shovel (also stripping shovel or front shovel or electric mining shovel) is a bucket-equipped machine, usually electrically powered, used for digging and loading earth or fragmented rock and for mineral extraction?



Fig.3 Dragline Excavator.

Tipper (Dumper Truck)

A tipper or dump truck (dumper truck) is a truck used for transporting loose material (such as sand, gravel or dirt) for construction. A typical dump truck is equipped with a hydraulically operated open-box bed hinged at the rear, the front of which can be lifted up to allow the contents to be deposited on the ground behind the truck at the site of delivery.



Types Of Dump Trucks

- Standard dump truck
- Articulated dump truck
- Transfer dump truck
- Truck and pup
- Super dump truck
- Semi trailer end dump truck
- Semi trailer bottom dump truck
- Double and triple trailer bottom dump truck

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