

4.1 Selection of equipment for earthwork excavation

Every earthmoving task at a construction site is different. It is, therefore, hard to choose a single earthmoving system for all the tasks. Each earthmoving operation has its objectives and complexity, based on which the best earthmoving system is chosen

1. Identify the Job of Equipment

Almost all earthmoving job includes clearing, excavating, and grading activities. The first important factor to consider while selecting an earthmoving equipment is defining the equipment's role. Some machines perform excavation alone, while some perform site preparation jobs.

2. Study the Site Soil Type

The type of soil is one of the most important criteria to consider when choosing the earthmoving equipment. For example, for smooth soil and soils that spread quickly, a scraper is recommended by engineers. Wheel tractor scrapers are the best choice for areas having sandy, loamy soil. For a construction site with hard and rocky soils or wet soils or wet clay material, the decision would be articulated truck. A scraper cannot work in such areas. So, to choose an earthmoving system, one must know the material type that is intended to be moved.

3. Study the Versatility and Flexibility of the equipment

The soil condition varies with the environmental conditions. So, the equipment used to work with the soil must be flexible and versatile enough to adapt to different soil conditions. This is a parameter considered while choosing earthmoving equipment.

Articulated hauler is one such earthmoving equipment that possesses excellent flexibility and versatility property. This equipment works best in limited traction. An articulated hauler is the right choice if the site is subjected to big weather changes.

4. Study the Hauling Distance

For smaller hauling distances, small equipment is right. When the hauling distance is higher, and the quantity of earth to be moved is high, it requires heavy and more robust equipment. This is because small equipment cannot sustain the load or pressure for a longer hauling distance. When a small equipment is made to work for larger hauling distance, it results in the machine's breakdown.

5. Determine the Cutting Work

The depth and length of earth cutting also influence the type of earthmoving equipment. A scraper finds it difficult to load the earth if the length of the cut is less than 100 ft. But this case is easily moved by articulated haulers. In construction areas, where there is enough space for outlining, a scraper works best. For digging a borrow pit, an articulated truck is the right choice.

Understanding Earthmoving Equipment

Every earthmoving operation is a combination of digging, scooping, and pushing the material. The earthmoving equipment is used to perform any of these operations. A contractor or engineer chooses the earthmoving equipment based on the utility and the tasks that need to be completed. The selection of the right earthmoving equipment improves the production and profit.

The three common types of earthmoving equipment used are excavators, loaders, and bulldozers. The features of these equipment and the task performed by each is tabulated in the column below. The understanding of different types of equipment plays a vital role in choosing the right earthmoving equipment.

Features	Excavators	Loaders	Bulldozers
Objective	Digging the earth or site material	Scooping the earth or site material	Pushing and smoothening the earth or site material
Task	Dredging, demolition, pile driving, material handling, mining	Used to move sand, gravel, snow. Used for small projects	The self-weight of the machine traverses the soil and level it.
Machine Components	Booms and Buckets that can drill and break hard strata	Scooping is performed using a bucket	A giant blade pushes the large quantities. A ripper is attached to tear rock and soil. Without blade and ripper, a bulldozer can fine grade the soil.

