



ANJUMAN-I-ISLAM'S KALSEKAR TECHNICAL CAMPUS NEW PANVEL

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SCHOOL OF ENGINEERING & TECHNOLOGY

SCHOOL OF PHARMACY

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Construction Equipments & Techniques - Draglines Mr. Prathamesh Gawade, Asst. Professor

Department: B.E. Civil Engineering Subject: Advanced Construction Equipments

Construction Equipments & Techniques



Draglines



Draglines



- Invented in 1904 by John.W.Page.
- Consists of a Bucket attachment manoeuvred by means of a no of ropes & chains.
- **Advantage** : Long reach for digging & Dumping.
- **Disadvantage** :No positive control as in the case of Hydraulic Excavators.
- No Hydraulic control – Breakout force derived strictly from selfweight –Chances of dipping or drifting of Equipment more.

Operation



- Empty bucket is taken to the area to be excavated.
- Digging is accomplished by pulling bucket towards machine.
- Digging Depth is regulated by means of tension maintained in the hoist cable.
- Once the bucket is filled, Operator swings it to the desired place.
- Drag & hoist cable both are loosened & the bucket is emptied.



Effectiveness of Dragline

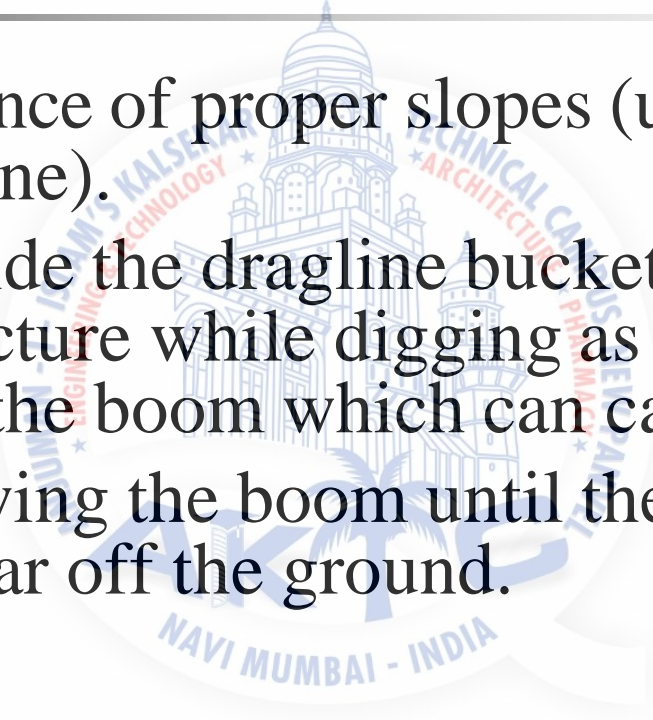
- Production capacity not in tune with the hydraulic Excavators.
- Since, no positive control as in the case of Hydraulic Excavators, chances of dipping or drifting of Equipment more.
- To overcome this, unit weight of material to be excavated must be known. Accordingly, Size & type of bucket should be chosen.

Effectiveness of Dragline

- **Types of buckets :**
- Light Duty – Easy to dig materials like Sand.
- Medium Duty – Clay, Soft Shale, Gravel.
- Heavy Duty – Mining, Handling hard & abrasive rocks.
- Perforated buckets should be used in waterborne areas to permit excess water to drain off.



Effectiveness of Dragline

- Maintenance of proper slopes (upwards towards the machine).
 - Never guide the dragline bucket by swinging the superstructure while digging as it may put side stress on the boom which can cause failure.
 - Do not swing the boom until the bucket has been raised clear off the ground.
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Construction Equipments & Techniques

Clamshells



Clamshells



- Vertically operated machine capable of working at, above & below the GL.
- Consists of 2 Scoops hinged together.
- Doesn't have Hydraulic control.
- Lifting capacity determined by boom length, operating radius, size of clam bucket & unit weight of material to be excavated.

Clamshell buckets



- Buckets are provided without teeth or with removable teeth.
- Capacity of bucket is indicated by water level capacity or deck area.
- Water level Capacity : capacity if the buckets are hung level & then filled with water.
- Deck Area : Area covered by buckets on ground when they are fully open.



Cycle time

- Final place of deposition plays a major role in affecting the cycle time.
- Dumping in open unrestricted space requires less time.
- If material is to be dumped directly from the clam bucket to some hopper (concentrated dumping), it requires more time.

Vaccum Excavators

- Make use of vacuum ; sometimes along with water jets.
- Suitable when work is to be done between previously laid electrical & communication conduits.
- Especially suitable for urban areas where there is no space for disposal of the excavate material.
- Excavated material is collected in a tank & then transported away for disposal.



Construction Equipments & Techniques



Trenching Machines

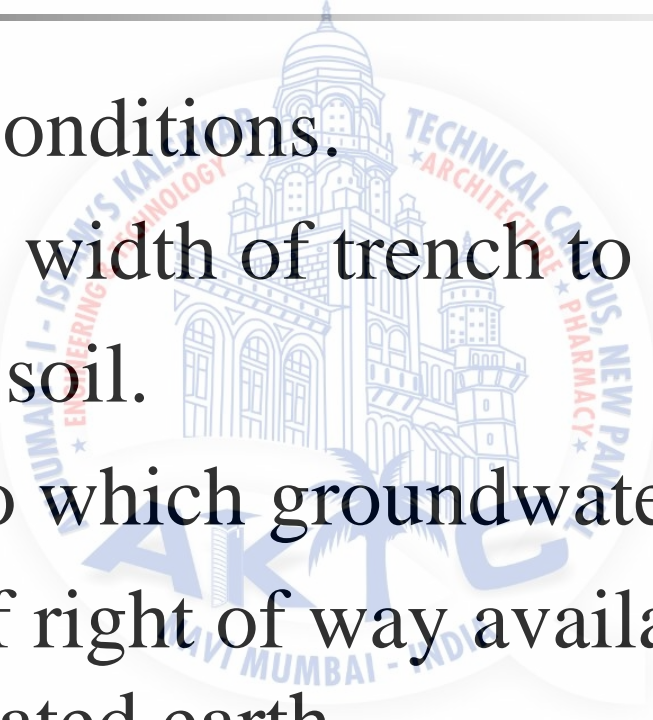


Trenching/Ditching Machines

- Designed to excavate trench or ditch for laying water ,sewer ,gas lines or creating shoulder drains on highways.
- Mostly crawler mounted & has full hydraulic control.
- Available in various sizes to suit various site requirements.
- Types
 - Wheel type
 - Ladder type



Choice of Equipment

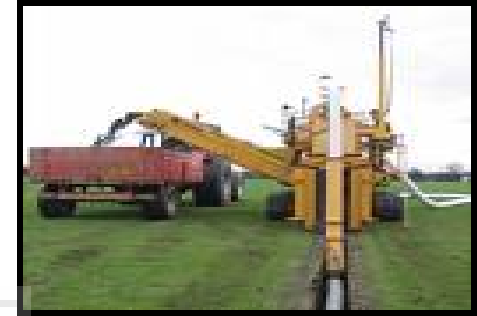
- Jobsite conditions.
 - Depth & width of trench to be excavated.
 - Class of soil.
 - Extent to which groundwater is present.
 - Width of right of way available for disposal of excavated earth.
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Wheel type TM



- Used for depths up to 3m & widths up to 1.5m.
- Consists of a power driven wheel ,on which a no. of removable buckets with cutter teeth are mounted.
- Sometimes buckets are such that side cutters may be attached to them if it is required to increase the width of the trench excavated.

Operation



- The power driven wheel rotates.
- The buckets also move, excavate the material & collect it.
- Excavated material is dumped on a belt conveyor provided on one side as shown above.

Ladder type TM



- Used for depths up to 10 m & widths more than 3m.
- Length & width of excavation can be adjusted by adding ladders or boom & by adding more buckets & chain links.
- Can operate at 30 various digging speeds to suit the needs of a given job.

Operation

- Excavating part of the machine consists of 2 endless chains that travel along the boom to which are attached the cutter buckets equipped with teeth.
- To increase the width, shaft mounted side cutters may be installed.





Production Capacity

- Class of soil.
 - Depth & width of trench to be excavated.
 - Extent of Trees ,Stumps ,roots.
 - Physical obstructions such as burried pipes ,sidewalls ,streets ,buildings.
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