



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

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SCHOOL OF ENGINEERING & TECHNOLOGY

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## Construction Equipments & Techniques – Rollers & Compactors

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Department: B.E. Civil Engineering

Subject: Advanced Construction Equipments

# Construction Equipments & Techniques



## Rollers & Compactors



# Compaction



- Compaction, improves soil properties, which further ;
  - Reduces or prevents settlement.
  - Increases strength.
  - Improves bearing capacity of soil.
  - Controls volume changes.
  - Lowers Permeability.



# Compacting Methods

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- Impact – Sharp blows.
- Pressure – Static Weight.
- Vibration – Reduction in voids due to shaking.
- Kneading – Manipulation or Rearranging

# Soil type v/s Compaction Method

<u>Method-</u> <u>Material</u>	Impact	Pressure	Vibration	Kneading
Gravel	Poor	No	Good	V Good
Sand	Poor	No	Excellent	Good
Silt	Good	Good	Poor	Excellent
Clay	Excellent	V Good	No	Good

# Sheepsfoot roller



- Consists of steel wheels equipped with cylindrical pads (feet) having resemblance to a sheep's foot.
- These pads penetrate through the top lift & actually compacts the lift below.
- To compact the upper layer, this roller should be followed by a lighter roller which will compact the upper layer.



Sheepsfoot Roller



# Sheepsfoot roller

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- Suitable for cohesive, fine-grained materials.
- Varying the weight of the roller by the use of ballast in the drum will vary the foot-contact pressure.
- These aerate the soil during the compaction, & hence ideally suited for working soils that have moisture contents above the acceptable moisture range.



# Tamping Rollers

- High speed, self propelled, works on kneading principle.
- Has 2 or 4 steel padded wheels equipped with a small blade to help level the lift.
- Pads have wider base & smaller face.



# Tamping Rollers



- As the roller moves over a surface, the feet (pads) penetrate the soil to produce a kneading action & a pressure to mix & compact the soil from the bottom to top of the layer.
- Effective on all soils except sand.
- Upper layer not compacted properly & require successive compaction.

# Vibrating Compactors

- Consist of vibrating drum which convert potential energy into kinetic energy.
- Vibration accompanied with pressure cause the particles to shift their positions & nestle more closely with adjacent particles to increase the density of mass.
- Vibrations vary from 1000 to 5000/minute.





# Vibrating Compactors

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- Vibro rollers are actuated by an eccentric **shaft** that creates vibratory action (**Shaft** is a body that rotates about an axis other than one through the centre of mass).
- Working Speed – 2 to 4 mph



# Vibratory Compactors

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- Smooth Drum :  
Most effective on granular materials & non-cohesive soils having up to about 10 % of the material having Plasticity Index (PI) of 5 or greater.
- Padded drum :  
Highly effective on soils with upto 50 % of the material having a PI of 5 or greater.

# Vibratory Compactors



Smooth Drum Compactor



Padded Drum Compactor

# Pneumatic Tyre Rollers

- Work on the principle of Kneading.
- Wheels can oscillate enabling them to follow the surface contour & reach the lower areas for uniform compaction.



# Pneumatic Tyre Rollers



- Available in sizes of 15 to 200 tonnes gross weight.
- Rear tyres are spaced to travel over the surfaces between the front tyres producing a complete coverage of the area.
- Propelling to other site requires some other vehicle due to the heavy weight & high tyre pressure..

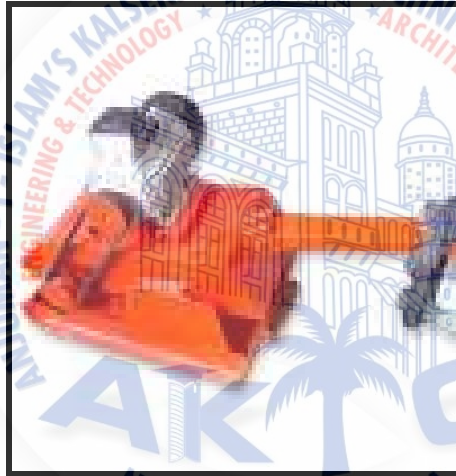


# Compactor Attachment

- A Compactor can be attached to an excavator while backfilling utility trenches or compacting side slopes.



# Manually operated compactors

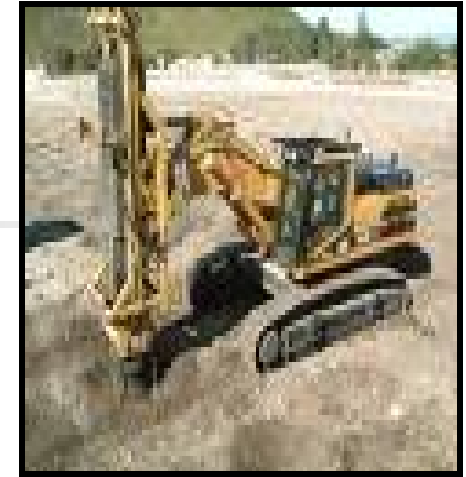


# Dynamic compactors

- Principle : Heavy weight repeatedly dropped on ground surface.
- Drop weight : 6 to 40 tonnes.
- Drop height : 10 to 30 metres.
- Cranes are used for lifting the drop weights.



# Dynamic compactors



## Disadvantages :

- Ground vibrations produced travel significant distances from the impact point.
- Difficult to work with when the water table is quite high.