EQUIPMENT USED TO COMPACT MATERIAL

FRESNO STATE Discovery Diversity Distinction

CEA CONSTRUCTION EMPLOYERS' ASSOCIATION

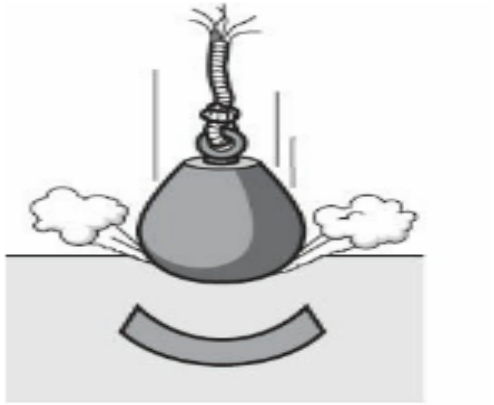
LEARNING OBJECTIVES (LO)

1. Understand what is the purpose of compacting material
2. Identify different compaction methods
3. Identify what methods are more suitable depending on the type of soil
4. Identify types of compacting equipment and understand what compaction method they use.
5. Identify what compacting equipment are better suited depending on the type of soil.

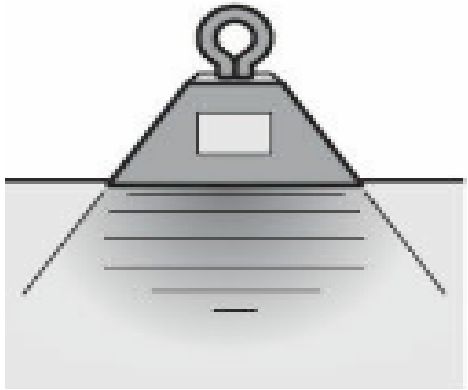
LO 1 Understand What is The Purpose of Compacting Material

1. Reduce and prevent settlement
2. Increase the strength of the soil
3. Improve load-bearing capacity
4. Control volume changes
5. Lower permeability
6. Improved Drainage

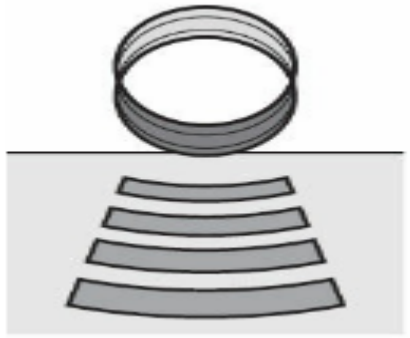
LO 2 Identify Different Compaction Methods



Impact - Sharp Blow



Pressure - Static Weight



Kneading - Manipulation or Rearranging

Vibration - Shaking

Material	Impact	Pressure	Vibration	Kneading
Gravel	Poor	No	Good	Perfect
Sand	Poor	No	Excellent	Good
Silt	Good	Good	Poor	Excellent
Clay	Excellent with Confinement	Very Good	No	Good

Tamping Rollers

- The drum of a tamping roller is equipped with a set of rectangular or wedge-shaped pads or feet
- High-speed, self-propelled, non-vibratory rollers
- Can equip a small blade
- Create a kneading action
- Help dry out excessive moisture

Smooth-Drum Vibratory Soil Compactors

- These are equipped with a smooth, cylindrical drum that vibrates rapidly in order to densify the soil and achieve compaction.
- Generate pressure, impact, and vibration
- Most effective on granular materials
- Can be used on semi-cohesive soils
- Smaller drums provide higher contact pressure with smaller contact areas
- Bigger drums produce extensive contact areas and smaller contact pressure.

Pad-Drum Vibratory Soil Compactors

- It is designed with a unique drum configuration, featuring a smooth drum instead of the typical smooth drum found in conventional vibratory rollers.
- Effective on up to 50% of the material with a PI of 5 or greater soils.
- Roller can walk out of the lift without fluffing the soil.
- Typical lift thickness on cohesive soil is 12-18 in.
- Typical contact weight: 250 to 300 pounds per lineal inch.

Pneumatic-Tired Rollers

- Pneumatic compactors use compressed air to compact the soil.
- Utilize kneading to compact the soil
- Used on small to medium size jobs
- Compact asphalt, chip seals, recycled pavement, base, and subbase materials
- The flexible tire surface allows pneumatic-tired rollers to maintain uniform density and bearing capacity

Equipment Recommendation

Compactor Type	Impact	Pressure	Vibration	Kneading
Sheep Foot		X		
Tamping Foot		X		X
Vibrating Smooth	X	X	X	
Vibrating Padfoot	X		X	
Pneumatic		X		X

Equipment Recommendation (Cont.)

Material	Lift Thickness (in.)	Number of Passes	Compactor Type	Comments
Gravel	8-12	3-5	Vib.Padfoot Vib. Smooth Pneumatic	Foot 150-200 psi - Tire 35-130 psi
Sand	8-10	3-5	Vib.Padfoot Vib. Smooth Pneumatic Smooth Static	- - Tire 35-65 psi Tandem 10-15 ton
Silt	6-8	4-8	Vib. Padfoot Tamping Foot Pneumatic	Foot 200-400 psi - Tire 35-50 psi
Clay	4-6	4-8	Vib. Padfoot Tamping Foot	Foot 250-500 psi -

"Lift thickness" refers to the vertical depth or thickness of each layer or lift of soil material that is compacted during the construction or compaction process.