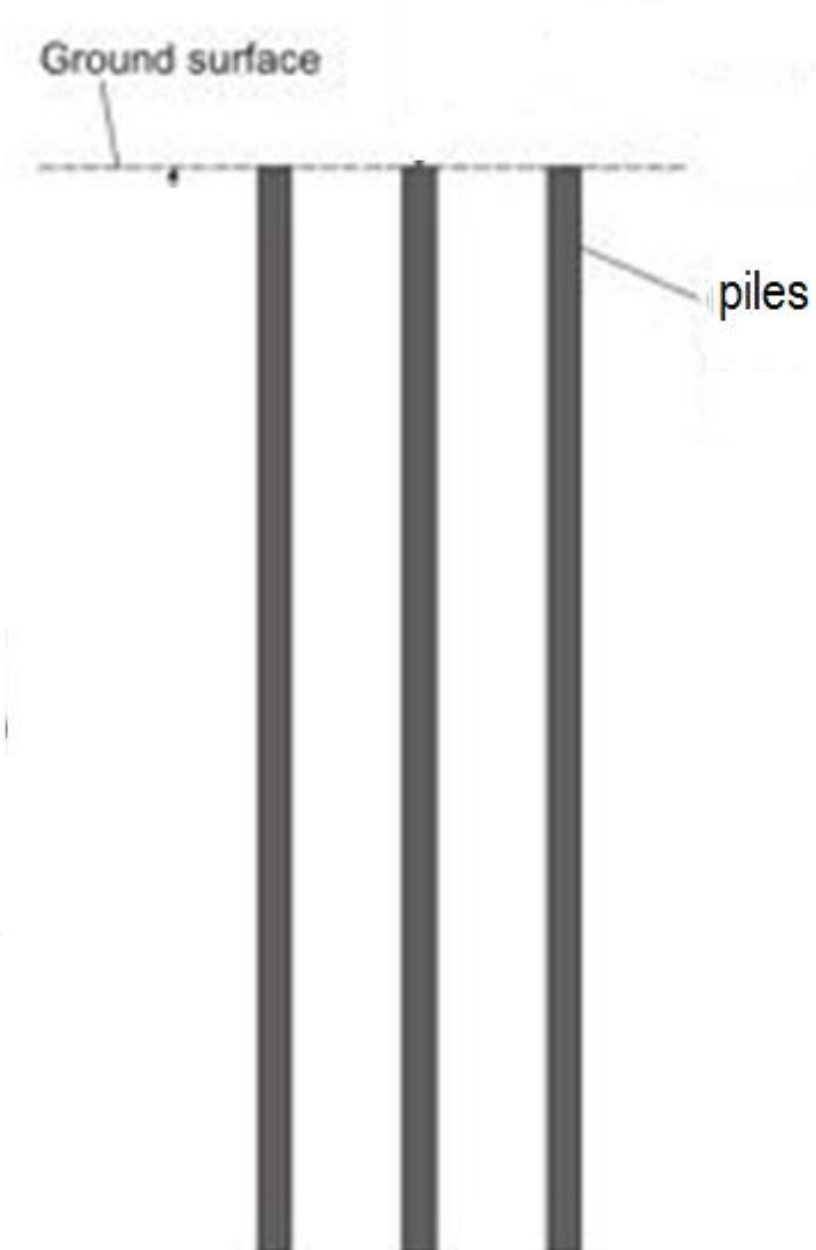
Deep foundations

Pile foundation

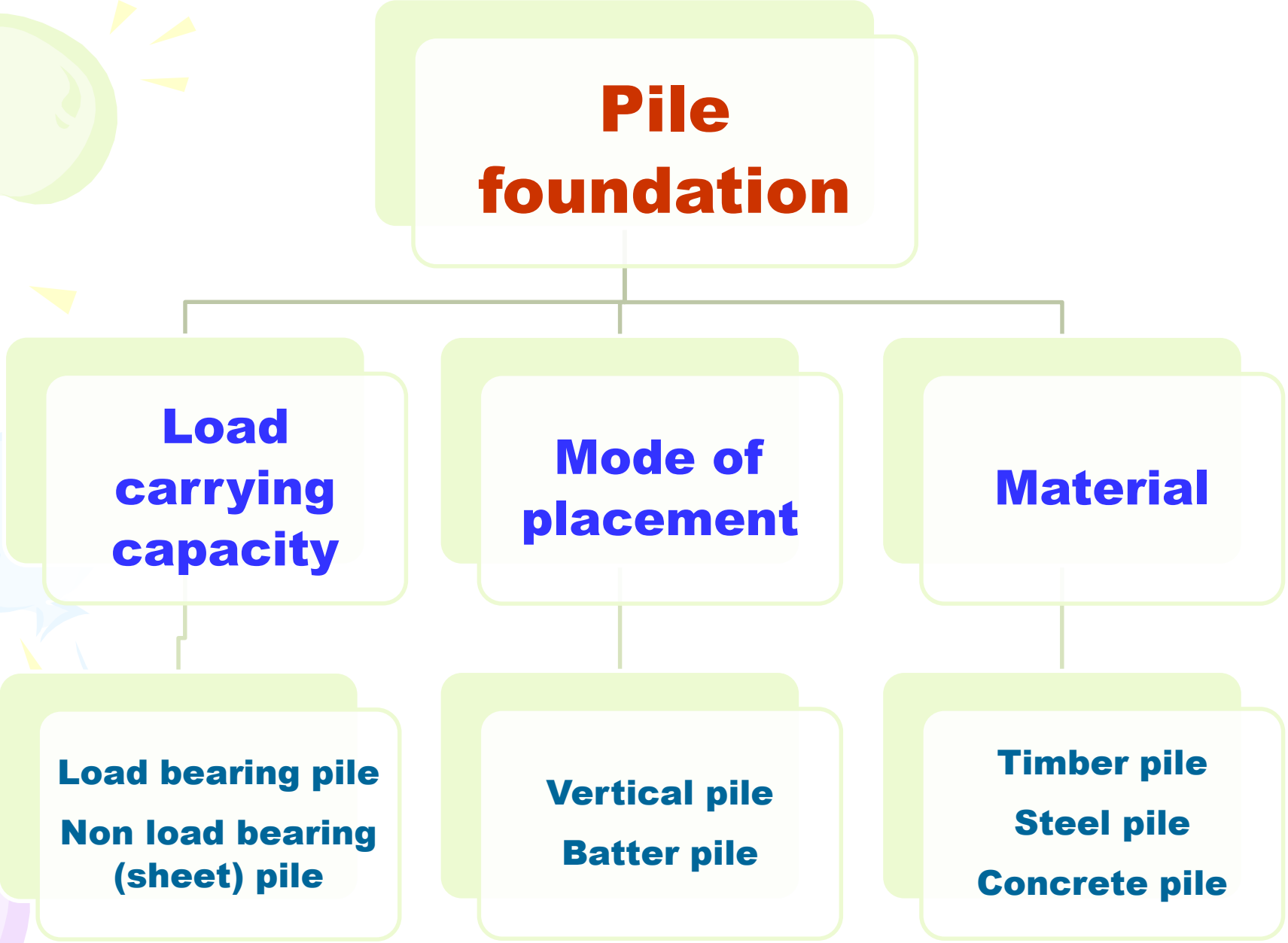
- **Deep foundation**
- **Vertical slender members - piles**
  - **Timber**
  - **Concrete**
  - **Steel**
- **Carry loads to large depths below GL**

Pile foundation



Pile foundation

- **When is it needed?**
  - **No firm strata exists at a reasonable depth**

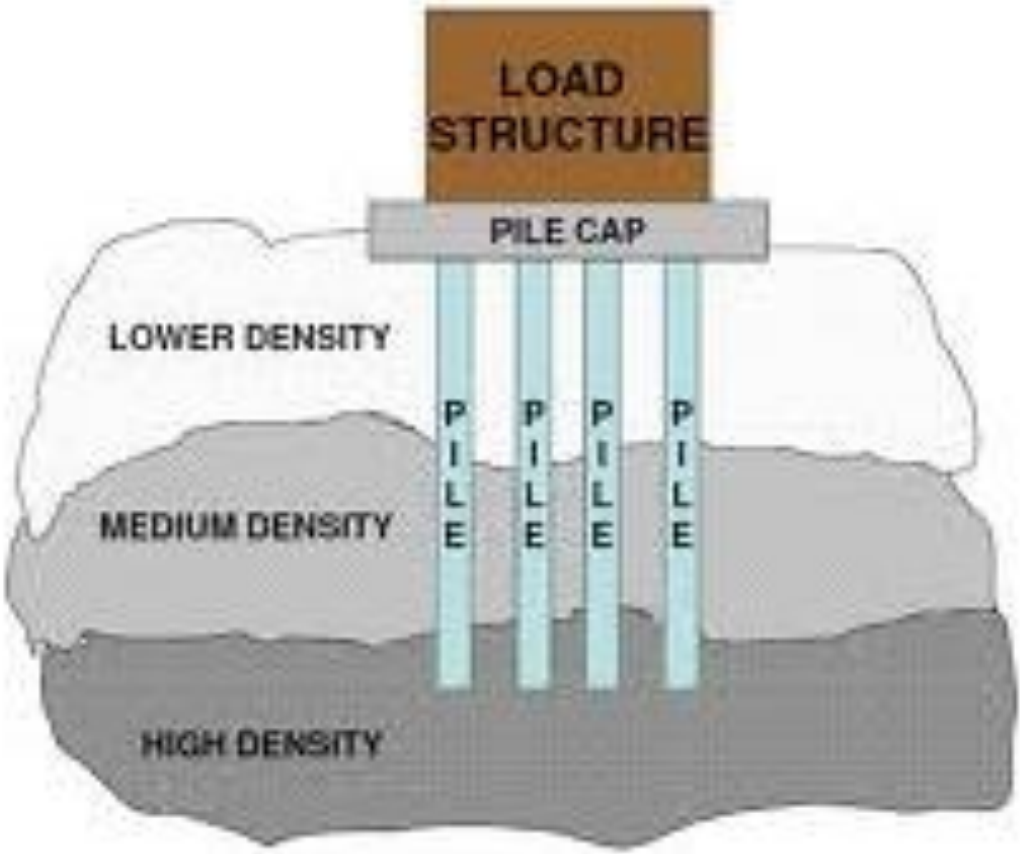

Pile foundation
Load carrying capacity
Mode of placement
Material
Load bearing pile
Non load bearing (sheet) pile
Vertical pile
Batter pile
Timber pile
Steel pile
Concrete pile

Load bearing pile

- End bearing pile
- Friction pile

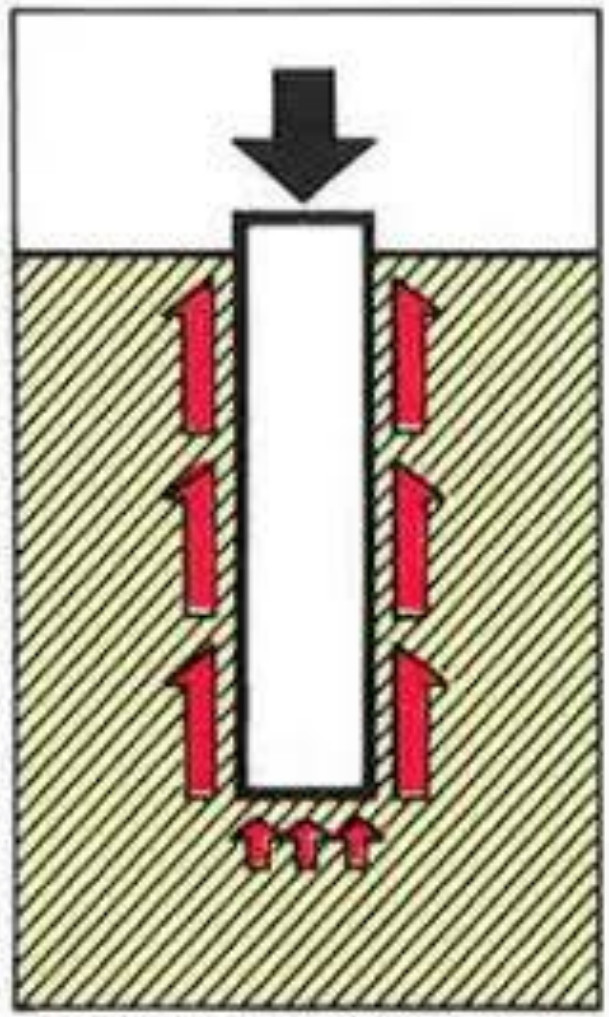
End bearing pile

- End rests on a hard stratum
- Transfers loads to that stratum



Friction pile

- Hard stratum is not available at a reasonable depth
- Piles are driven to such an extent that friction between pile and soil resists column loads
- Granular soils



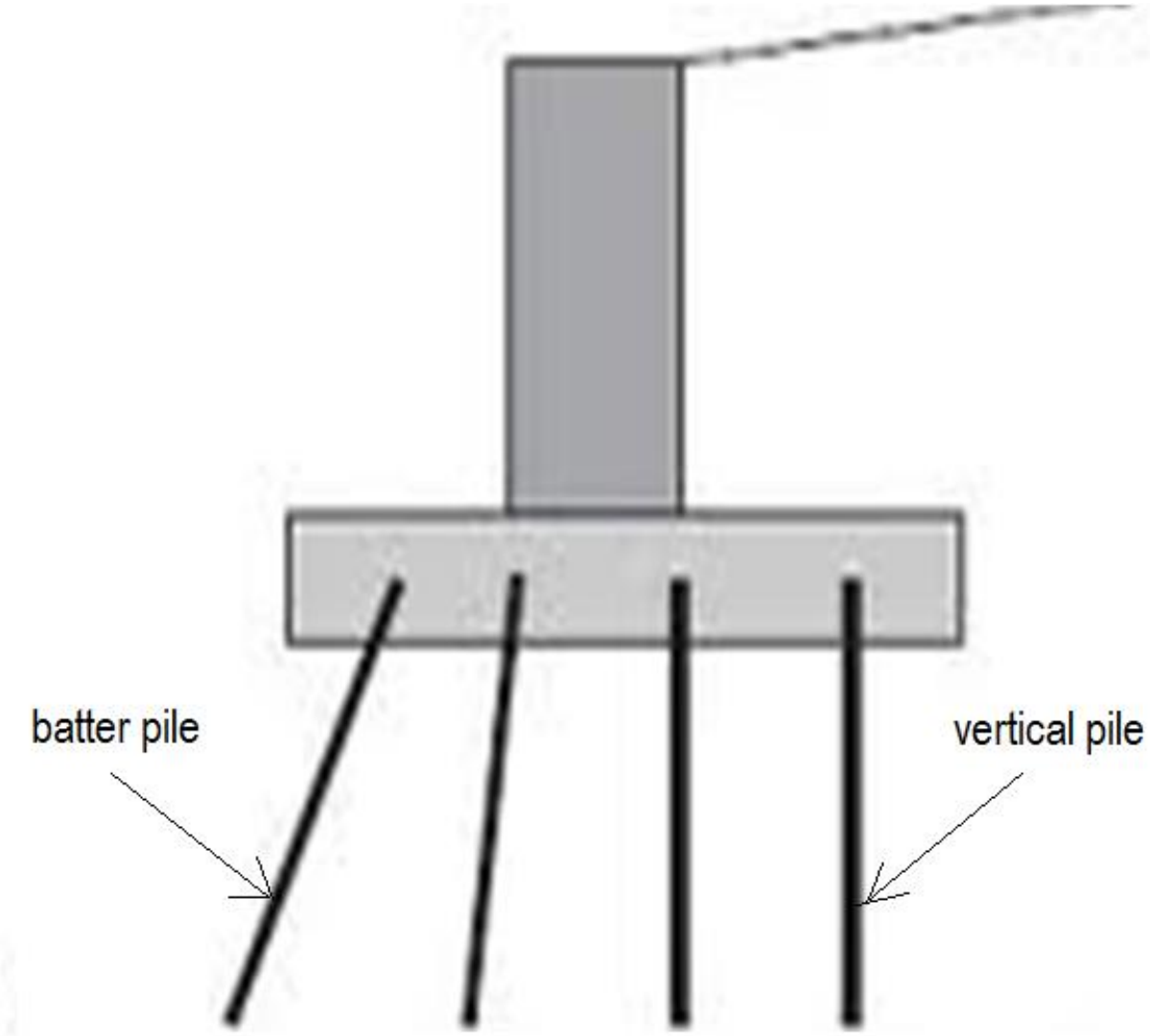
Non load bearing pile

- **Sheet pile**
  - thin interlocking sheets of steel
  - to obtain a continuous barrier in the ground.
- **Main application**
  - retaining walls
  - cofferdams

Non load bearing pile

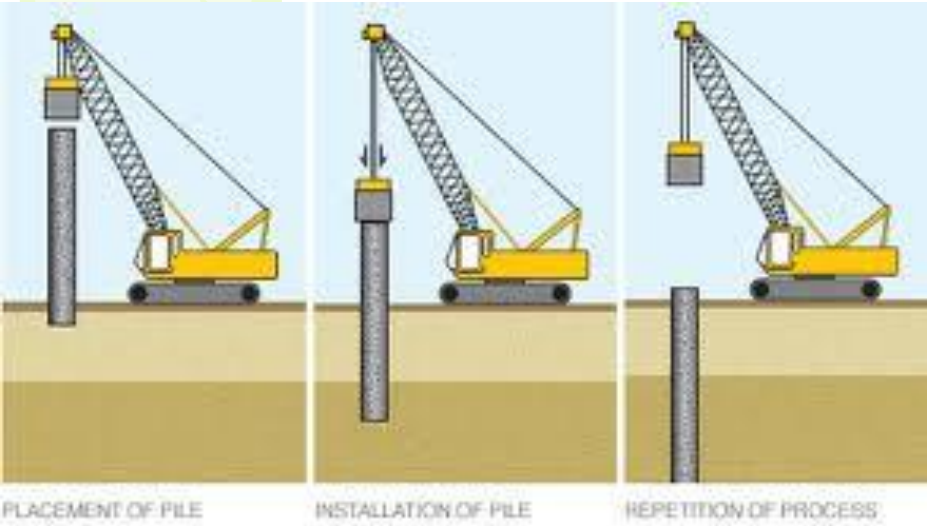
Non load bearing pile

Vertical and batter piles

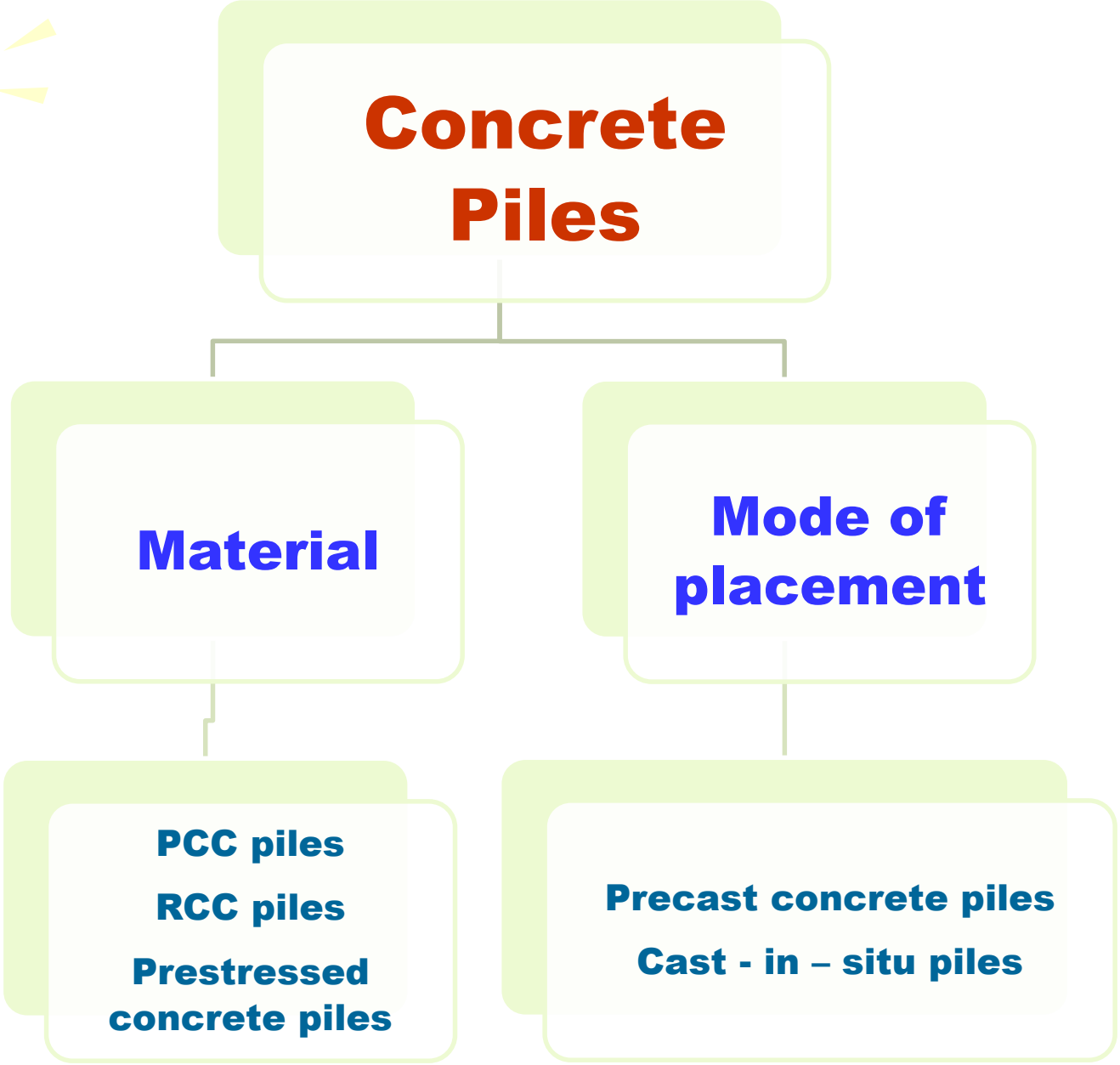


Timber piles

Steel piles


PLACEMENT OF PILE
INSTALLATION OF PILE
REPETITION OF PROCESS

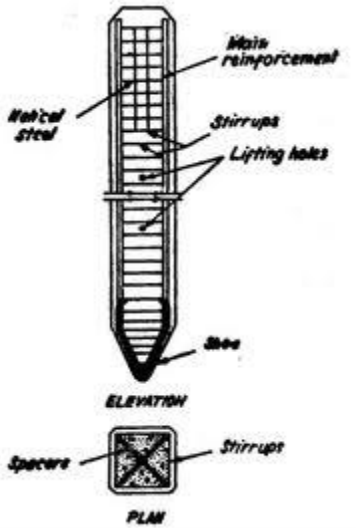

The first load of steel pile for
the Travelift piers. 04/21/05

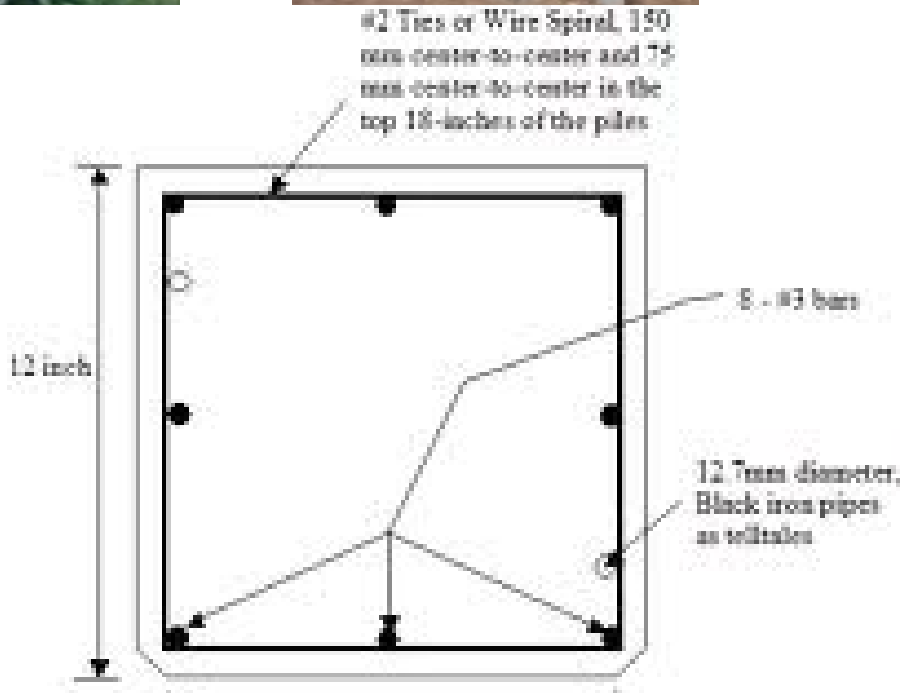

Concrete Piles
Material
Mode of placement
PCC piles
RCC piles
Prestressed concrete piles
Precast concrete piles
Cast - in – situ piles

Precast concrete piles

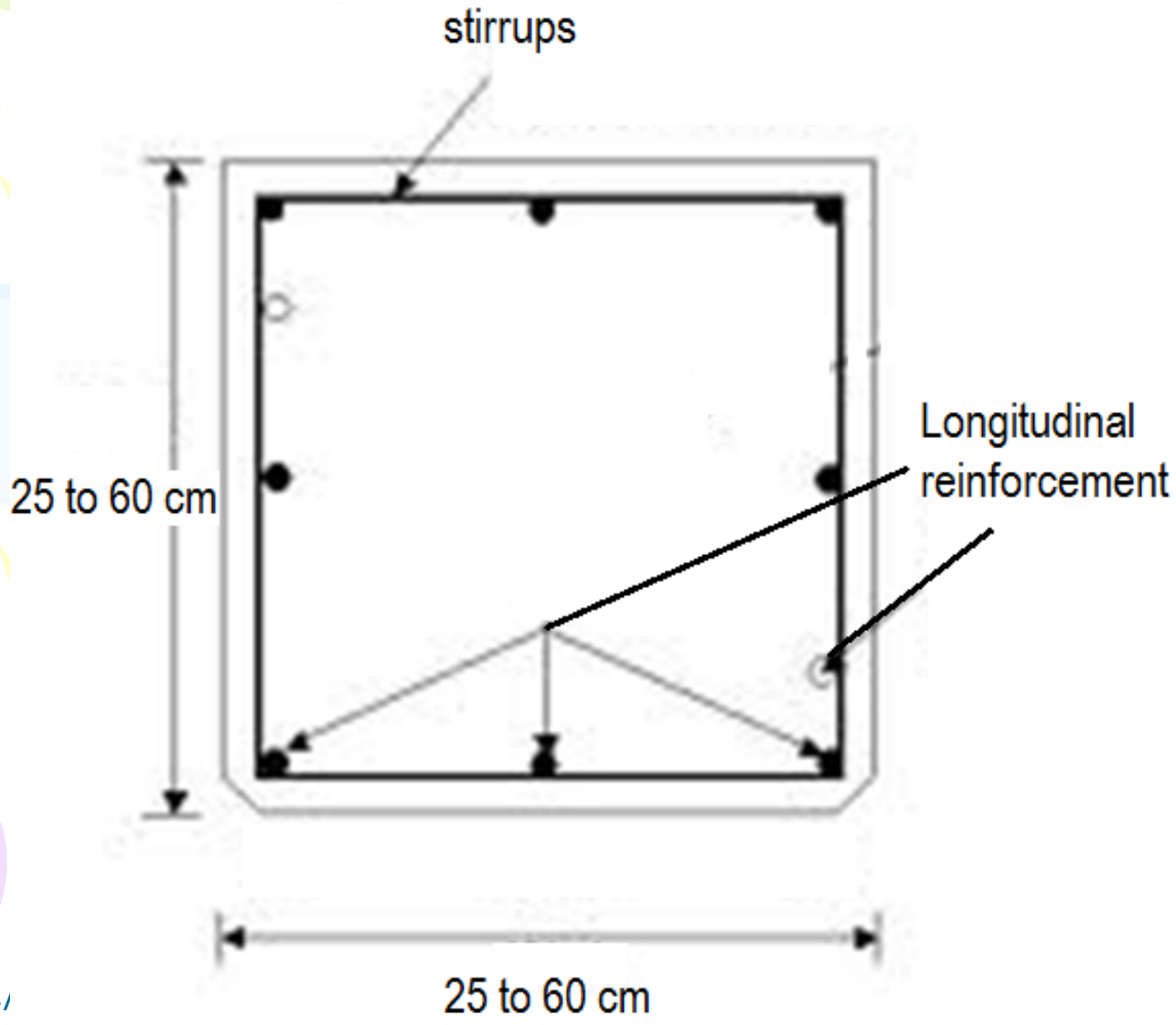
- Cast at factories, cured and brought to site
- Driven to ground

Precast concrete piles

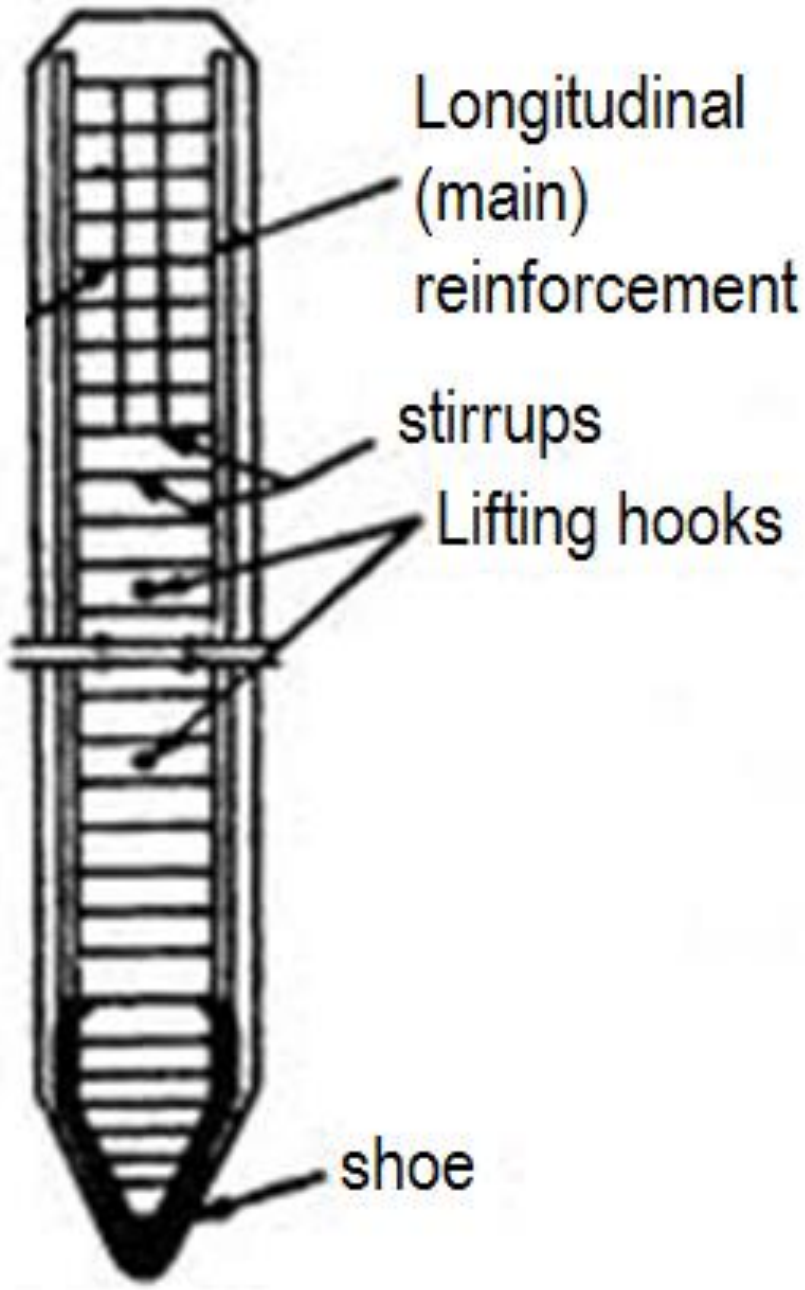




Precast concrete piles

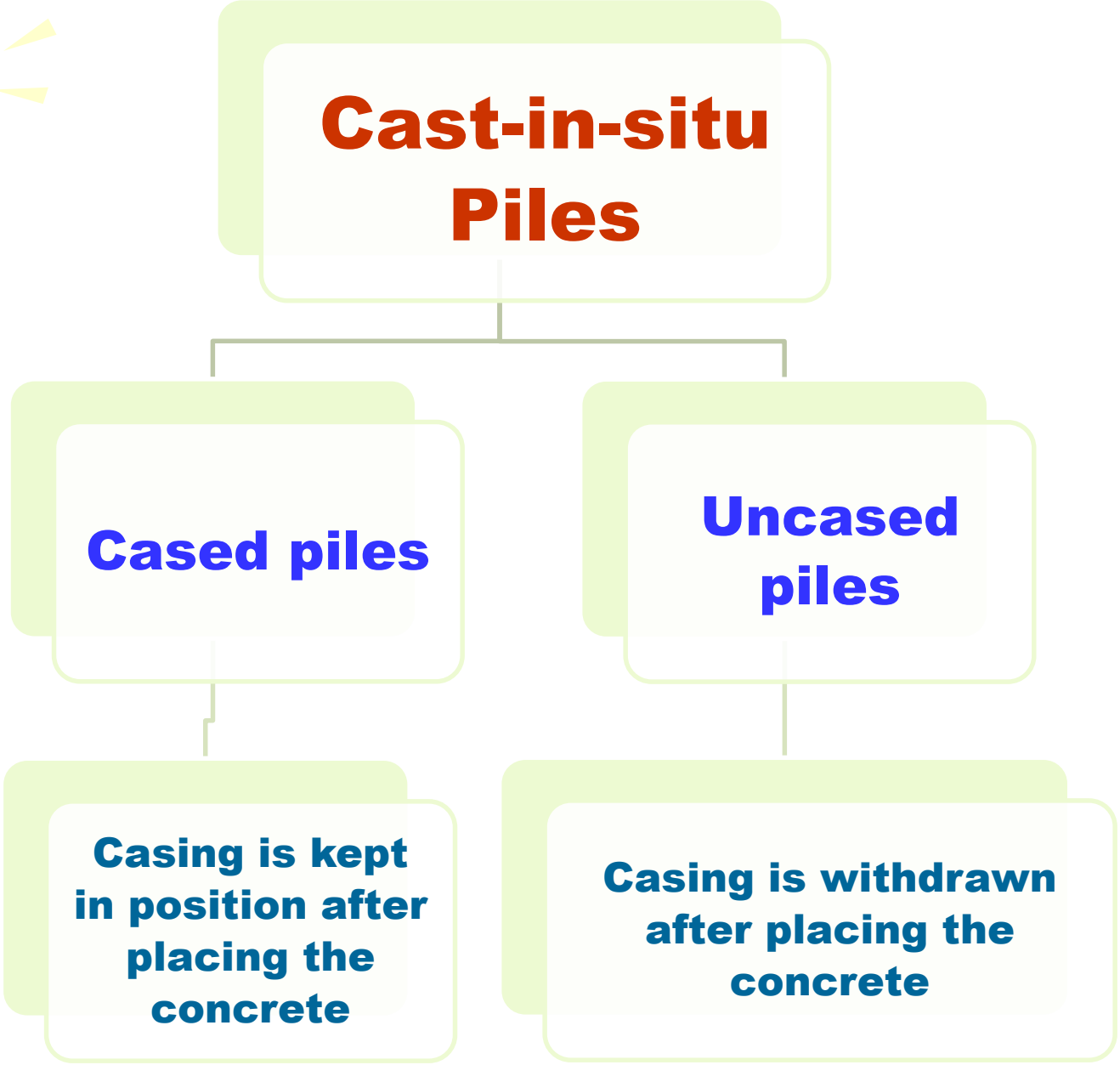


Precast concrete piles



Cast-in-situ piles

- Cast at the place where they have to function
- Process
  - A hole is excavated
  - A casing is driven
  - Filled with concrete

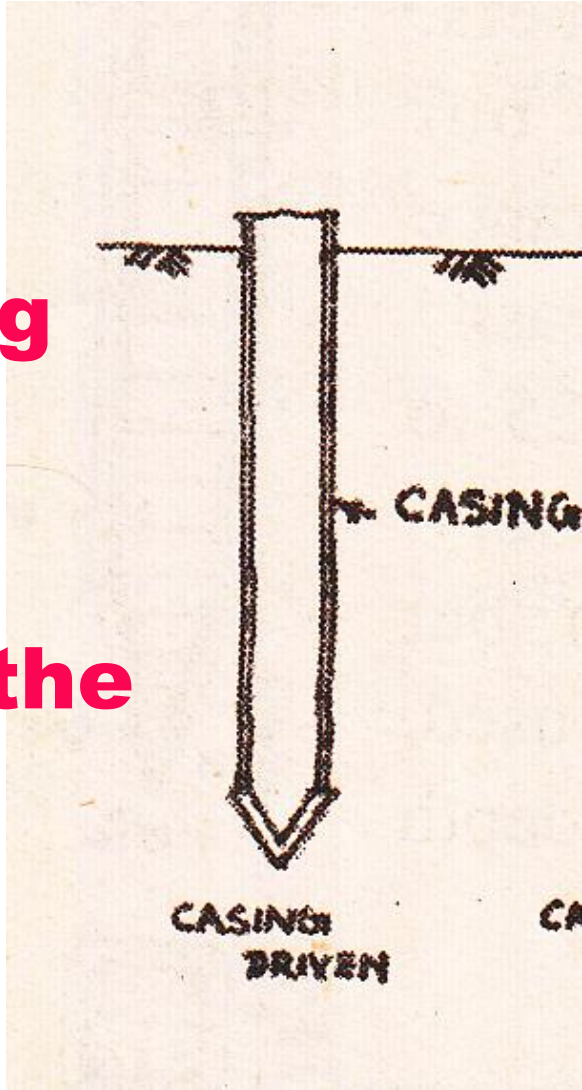

Cast-in-situ Piles
Cased piles
Uncased piles
Casing is kept in position after placing the concrete
Casing is withdrawn after placing the concrete

Cast-in-situ Piles

- Simplex pile
- Pedestal pile
- Vibro pile
- Under reamed pile

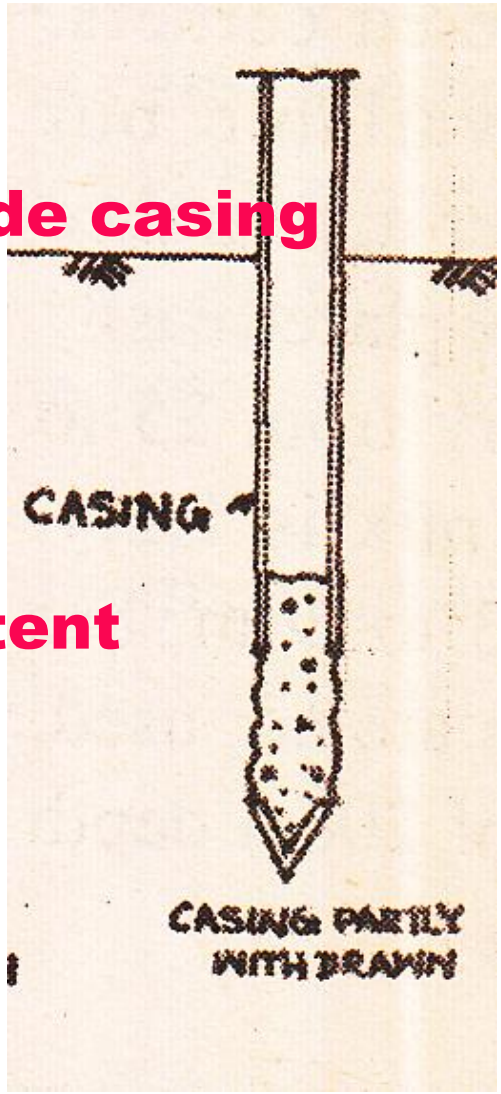
Simplex piles

- **Step1**
  - **Hollow cylindrical casing**
  - **With cast iron shoe**
  - **Driven to the ground to the required depth**

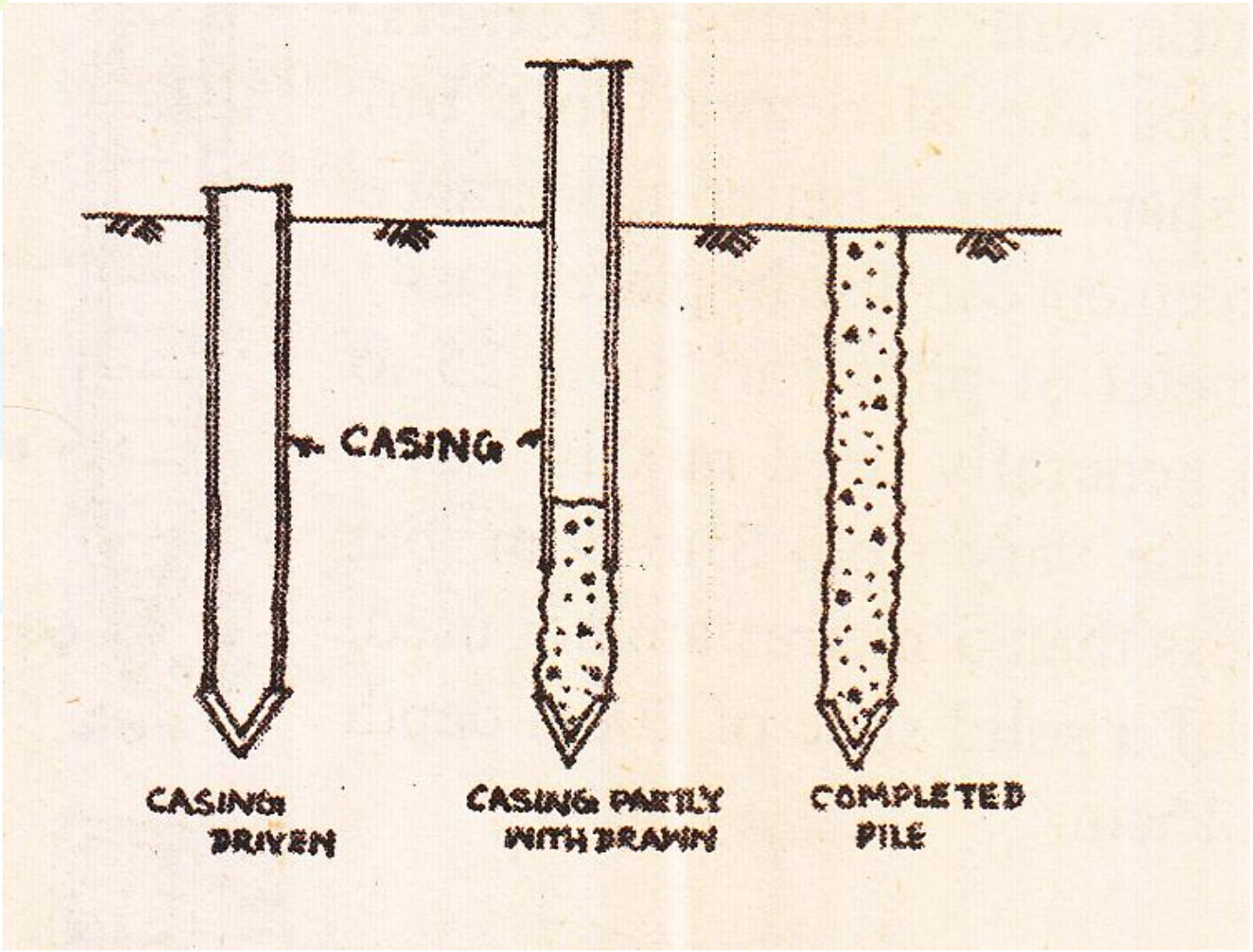


Simplex piles

- **Step 2**
  - Place reinforcement frame inside casing
  - Pour concrete – 1 m
- **Step 3**
  - Withdraw casing upto some extent
  - Pour concrete again
- **Step 4**
  - Repeat process

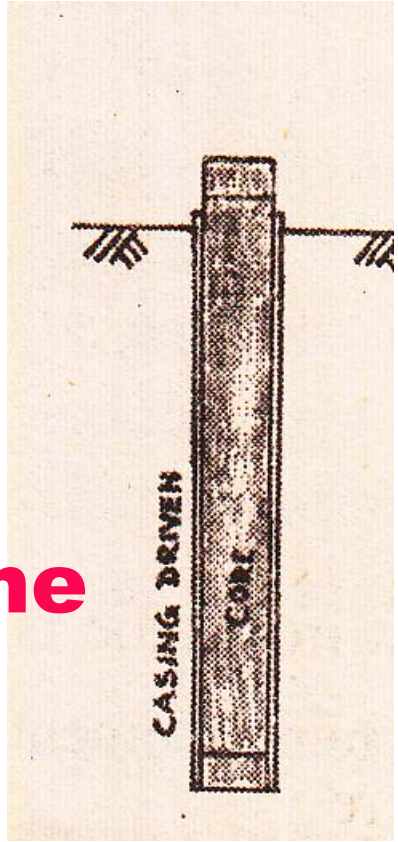


Simplex piles



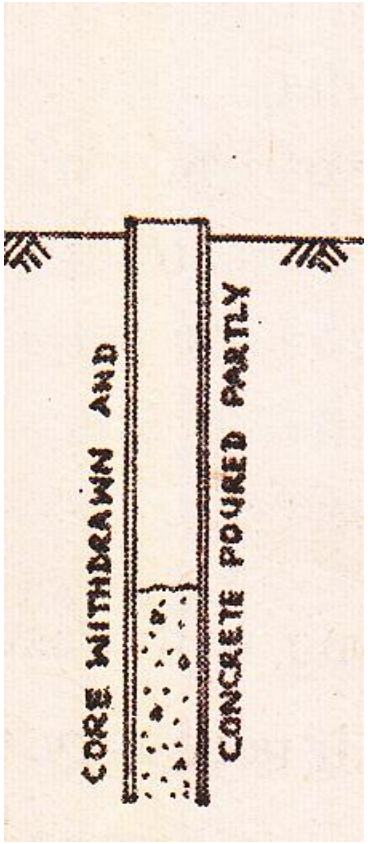
Pedestal piles

- **Step1**
  - **Hollow cylindrical casing**
  - **With core**
  - **Driven to the ground to the required depth**



Pedestal piles

- **Step 2**
  - **Remove core**
  - **Pour concrete – 1 m**

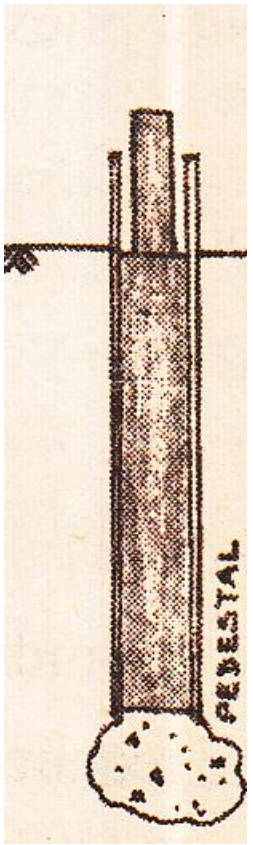


Pedestal piles

- **Step 3**
  - **Put core into casing again to press concrete**
  - **Withdraw casing by 0.75 m**

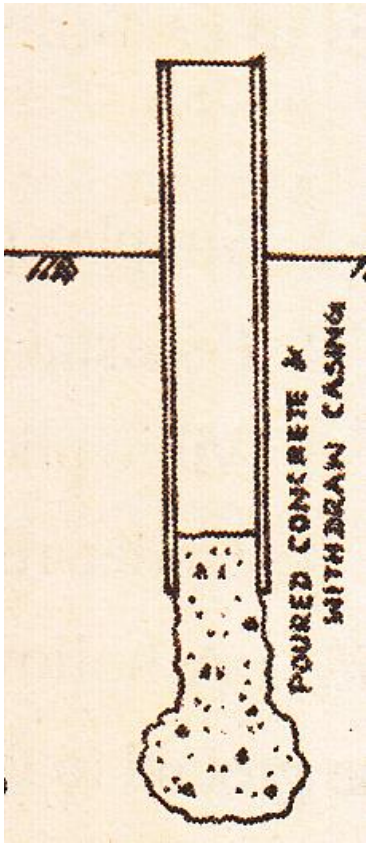
Pedestal piles

- **Step 4**
  - **Well compact the poured concrete**
  - **A bulb formed at bottom**
  - **Pedestal**



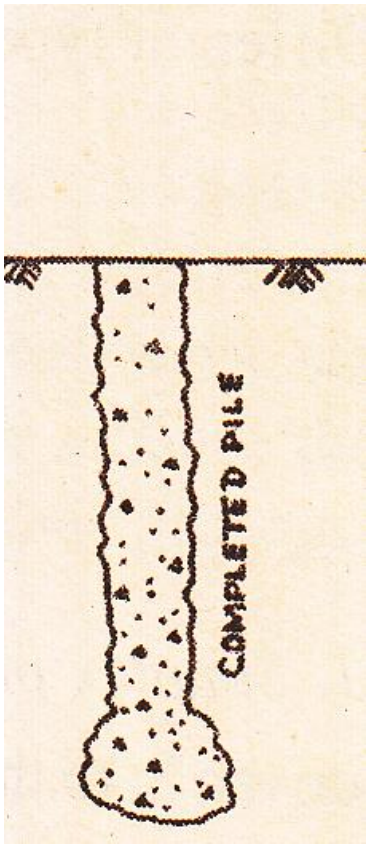
Pedestal piles

- **Step 5**
  - **Remove core**
  - **Pour concrete into casing**

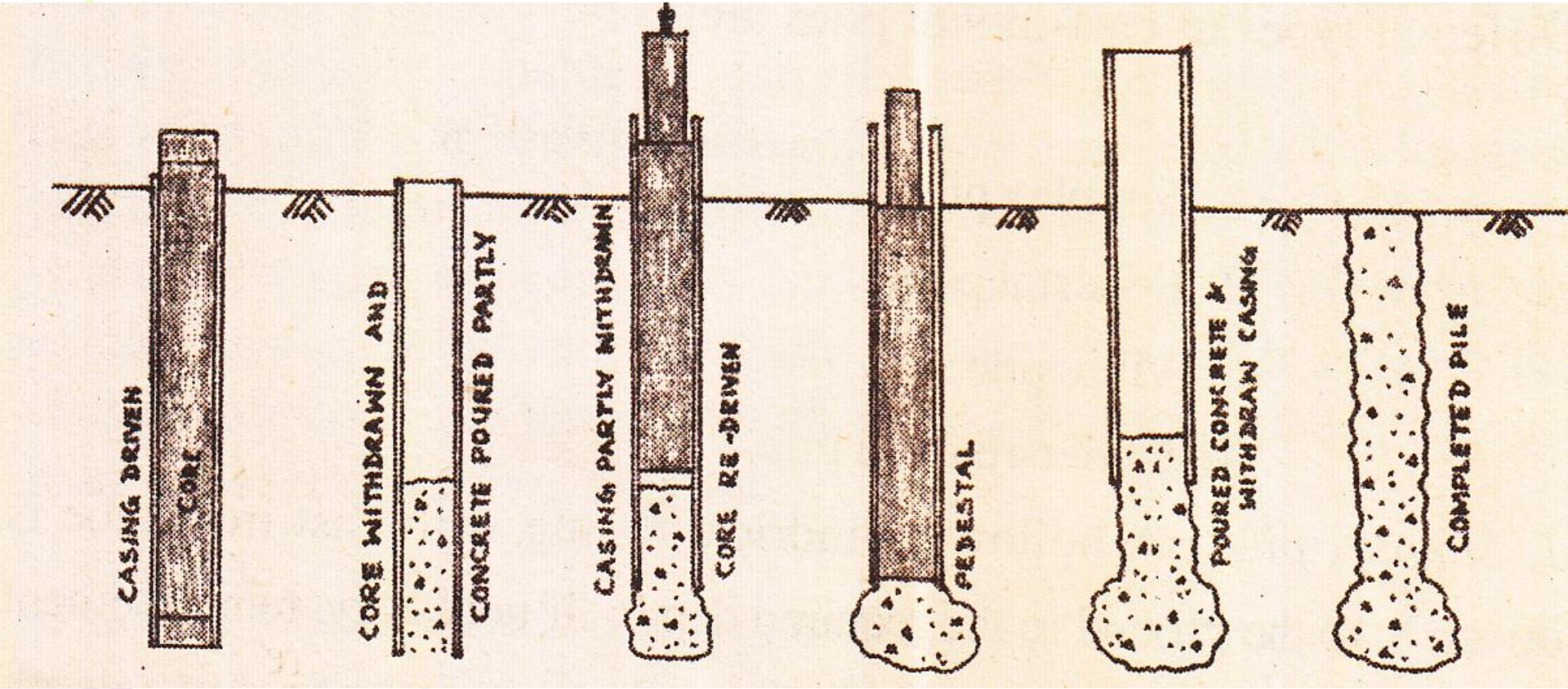


Pedestal piles

- **Step 6**
  - **As concrete filled upto ground surface**
  - **Casing gradually withdrawn**

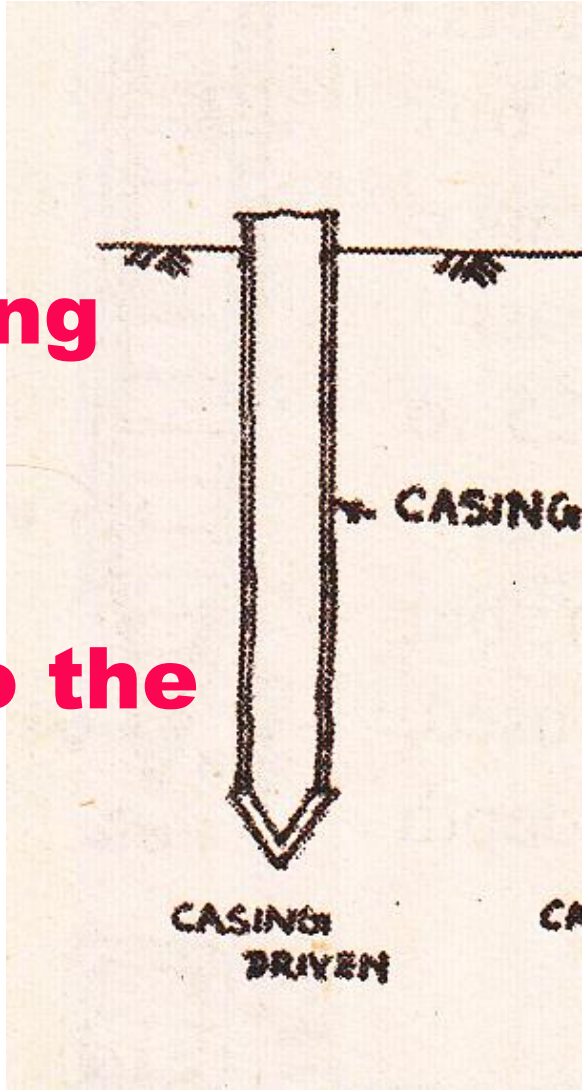


Pedestal piles



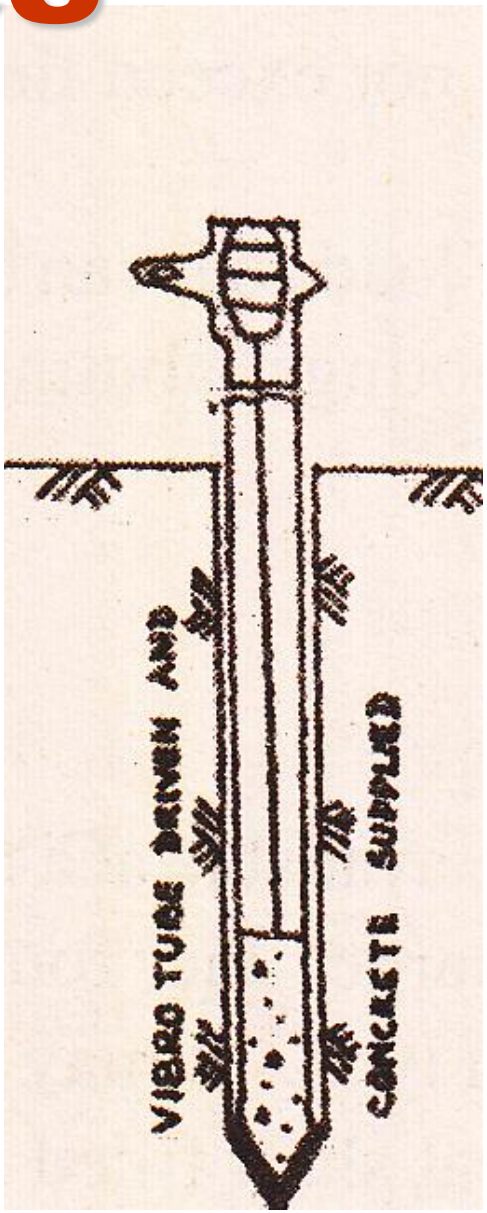
Vibro piles

- **Step 1**
  - **Hollow cylindrical casing**
  - **With cast iron shoe**
  - **Driven to the ground to the required depth**



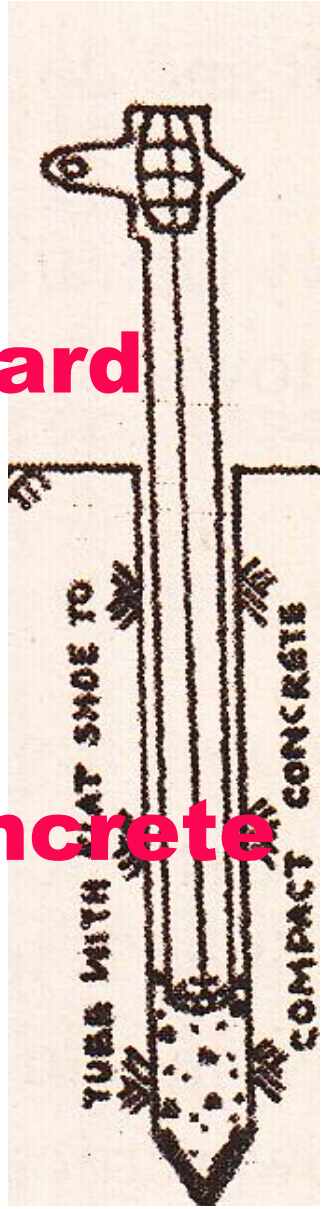
Vibro piles

- **Step 2**
  - **Concrete filled**
  - **Extracting links fitted to casing**

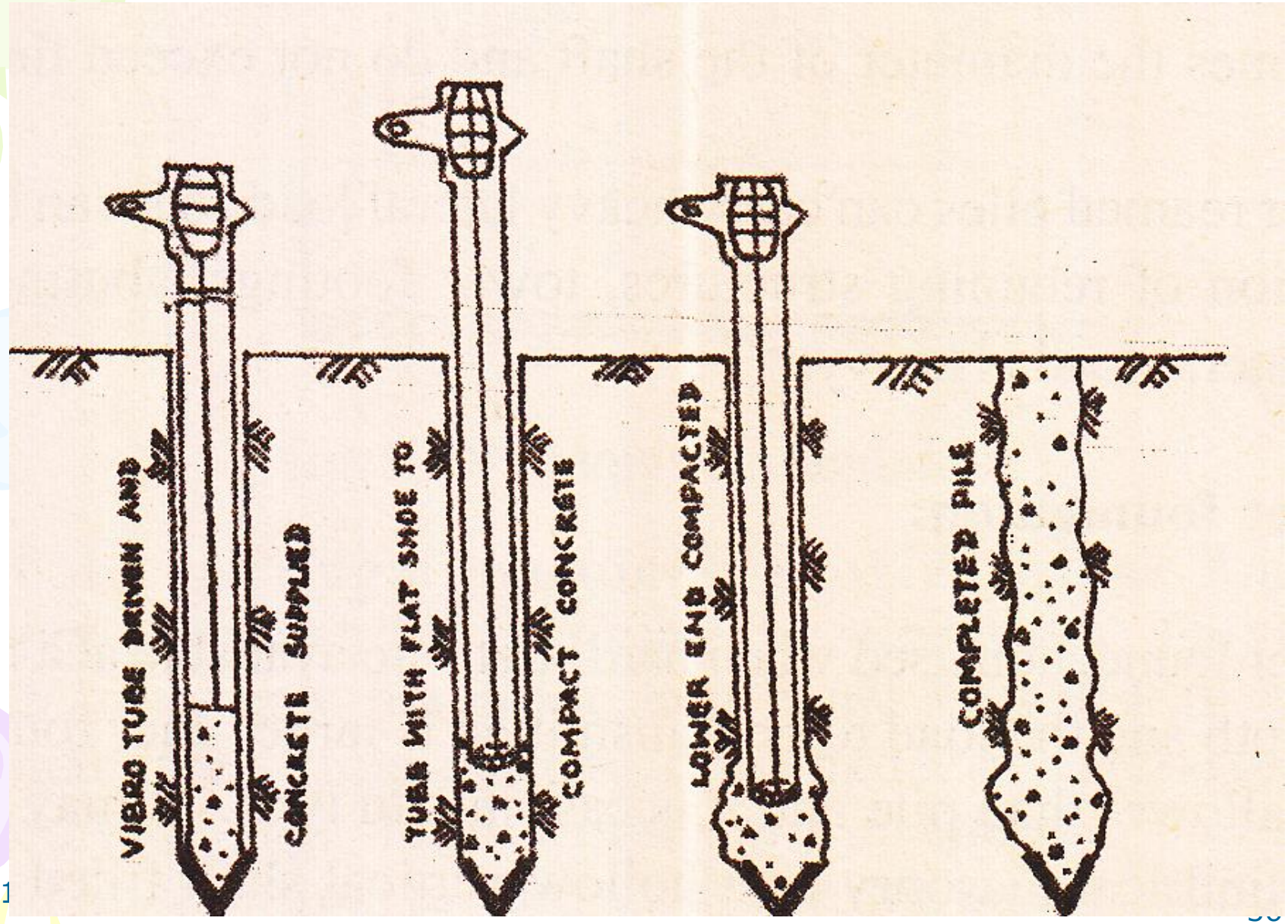


Vibro piles

- **Step 3**
  - **Upward blows and downward blows given with hammer**
  - **Upward – extracts casing**
  - **Downward – Compacts concrete**

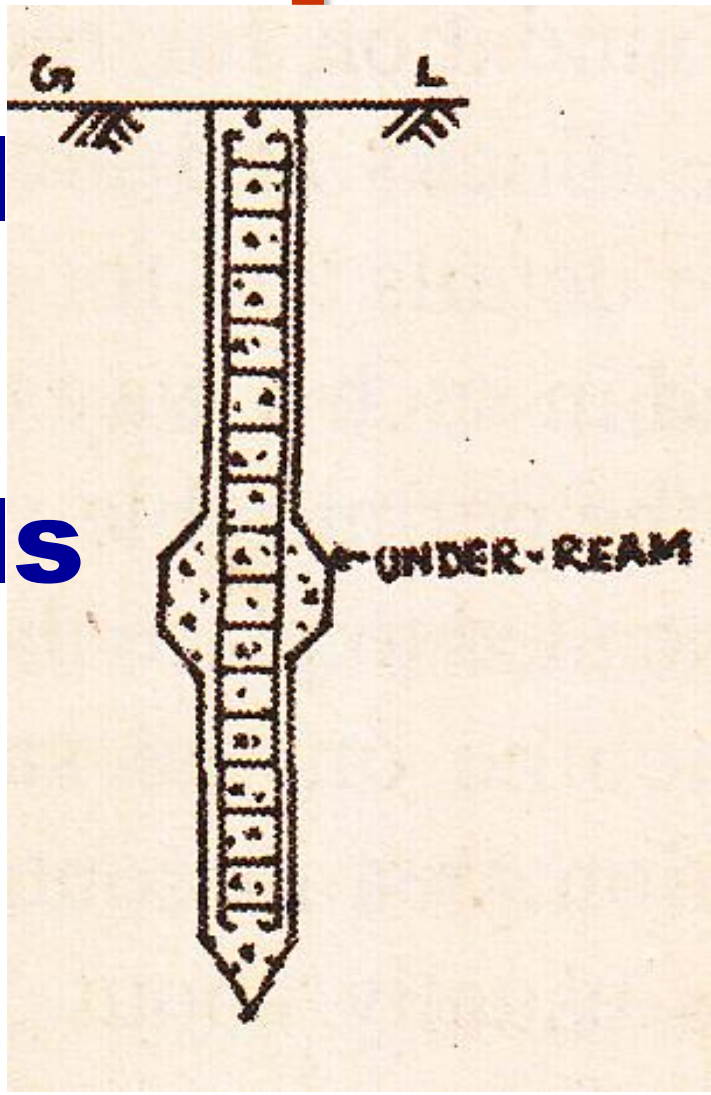


Vibro piles

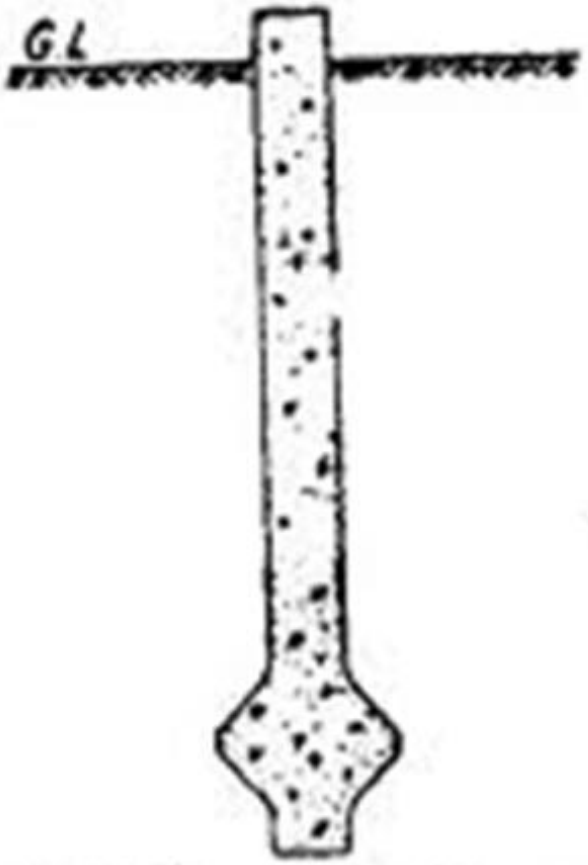

VIBRO TUBE DRIVEN AND
CONCRETE SUPPLIED
TUBE WITH FLAT SHOE TO
COMPACT CONCRETE
LOWER END COMPACTED
COMPLETED PILE

Under reamed piles

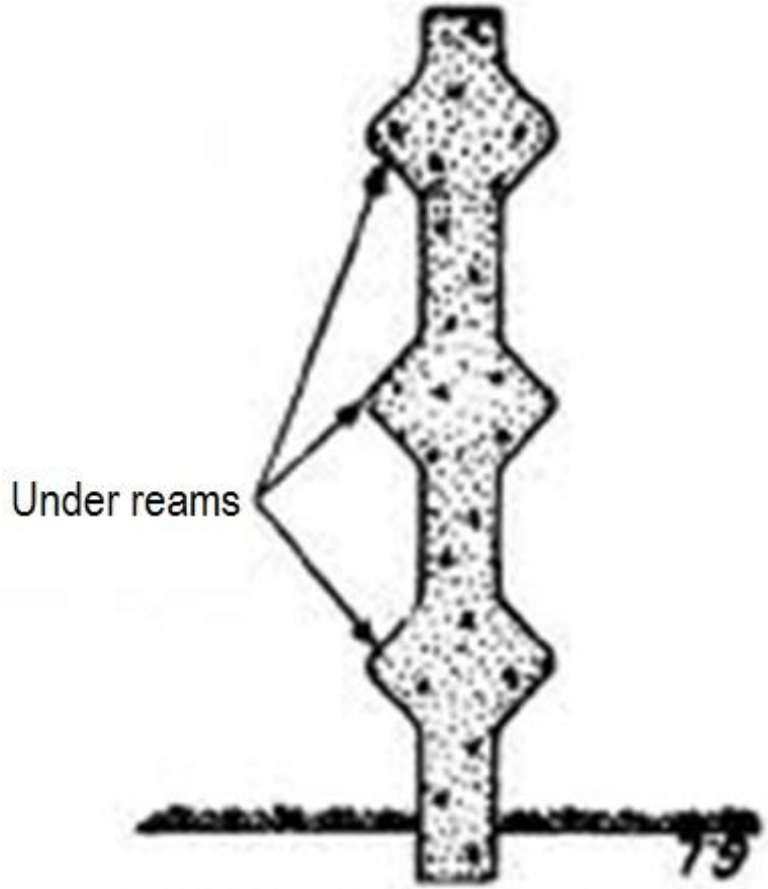
- For heavy lateral loads
- In expansive soils



Under reamed piles



(a) Single-bulb cast *in-situ* pile



(b) Multi-bulb piles

Under reamed piles