LOAD CARRYING CAPACITY OF PILE GROUPS IN SANDS AND CLAYS

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UNDER THE GUIDENCE OF
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INTRODUCTION TO PILES

- Piles are long, slender members used to transfer loads deep into the soil.
- They are essential when surface soils lack sufficient bearing strength.
- Piles ensure stability for heavy structures in weak ground conditions.

APPLICATIONS OF PILE FOUNDATION

1.Buildings: High-rise buildings, residential complexes, commercial structures

2. Bridges: Bridge foundations, transfer loads to deeper soil or rock

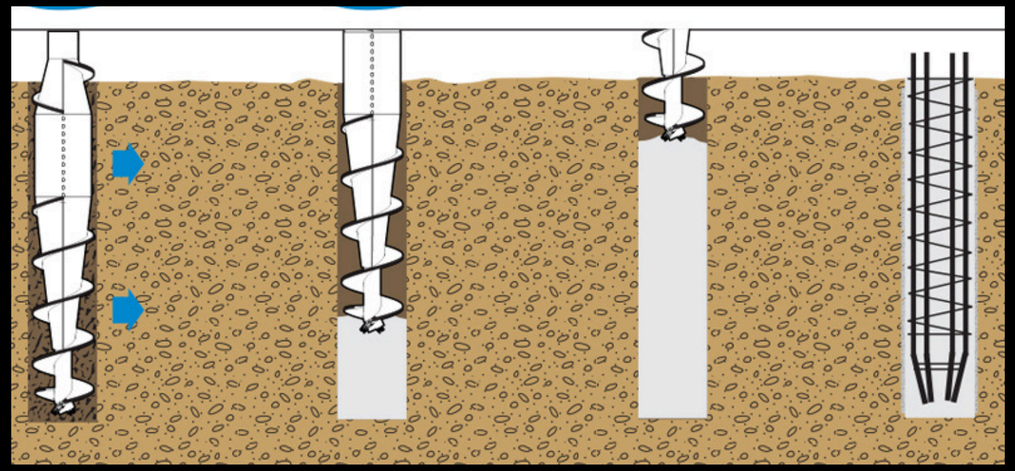
3. Towers: Transmission towers, wind turbines, tall structures

4. Waterfront Structures: Docks, piers, wharves, jetties

5. **Retaining Walls:** Support retaining walls, prevent soil erosion

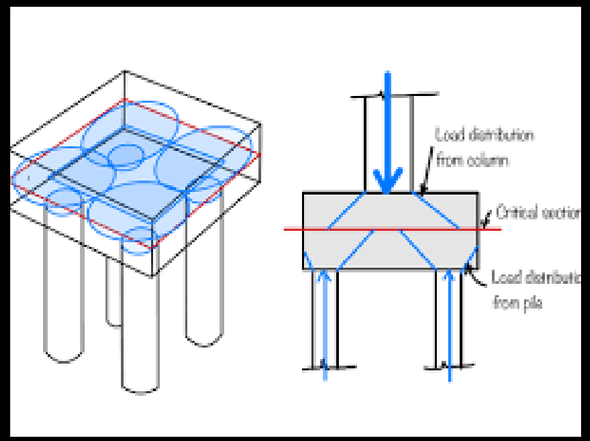
6. Machine Foundations: Support heavy machinery and equipment

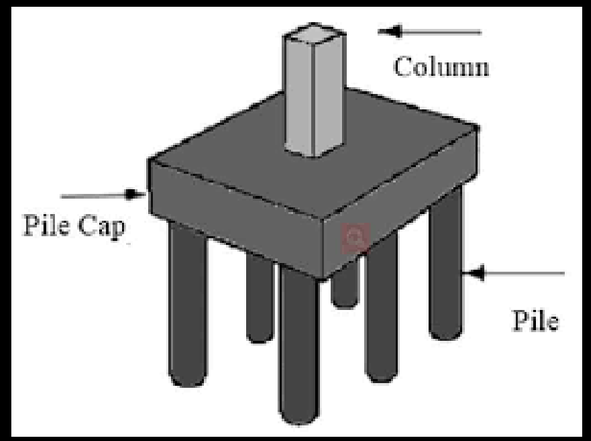
7. Highway and Railway Structures: Bridges, embankments, infrastructure



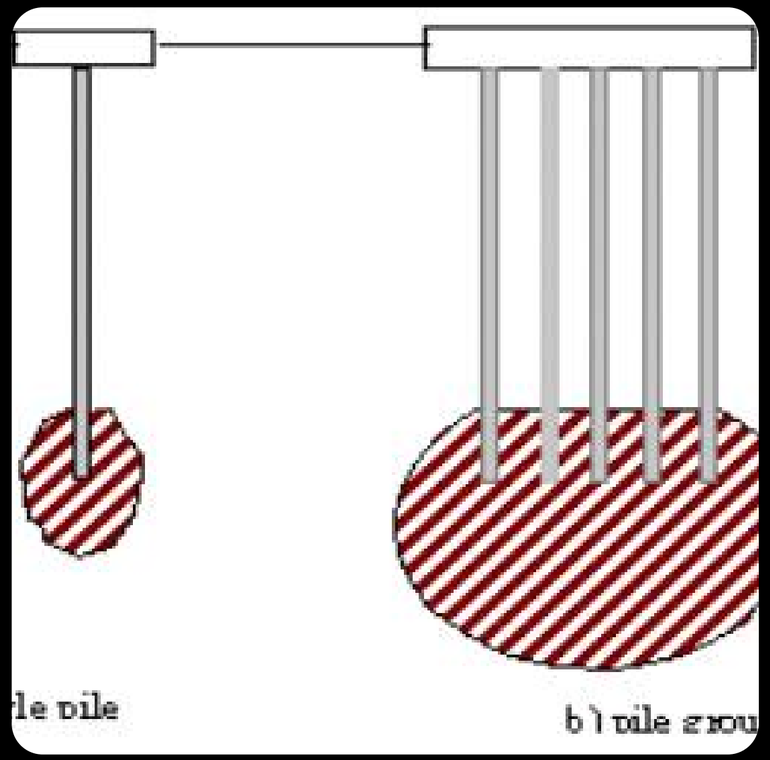
INTRODUCTION TO LOAD CARRYING CAPACITY OF PILE GROUPS

- Understanding load capacity is crucial for safe design.
- Pile groups behave differently in sands and clays.
- Interaction effects among piles impact group performance.





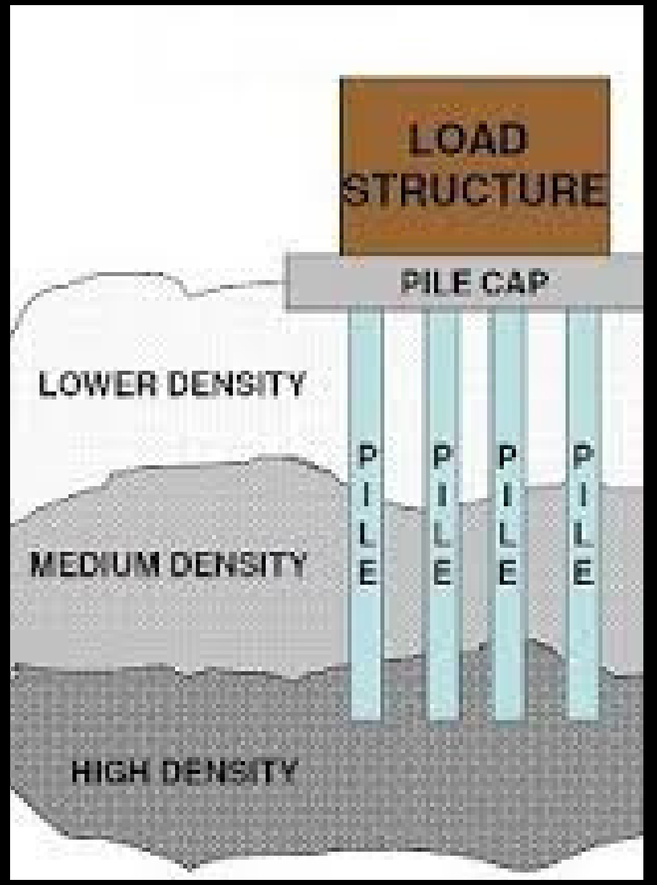
GROUP PILES

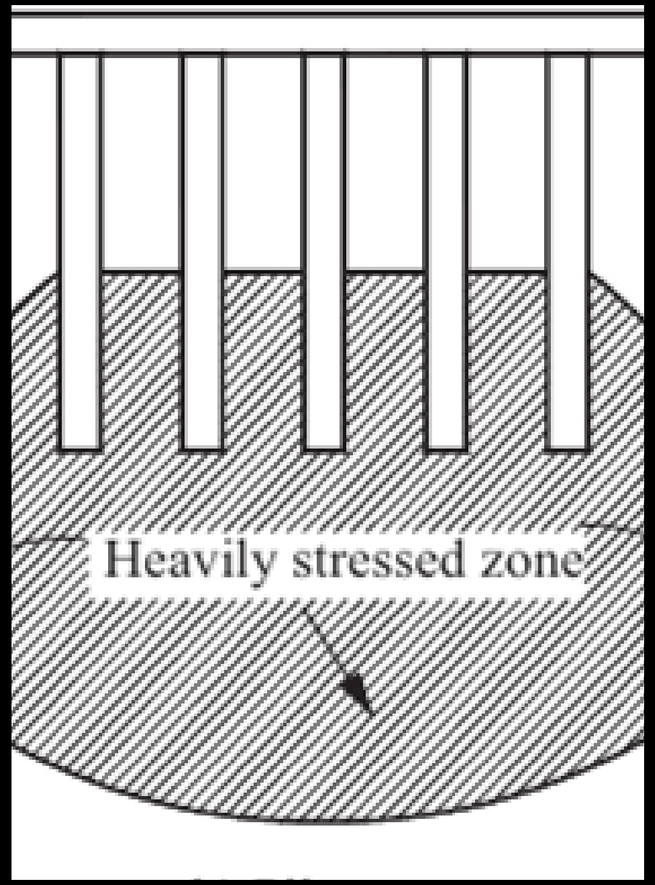


- Group piles refer to a cluster of individual piles, typically made of concrete, steel, or timber, that are driven or drilled into the ground to support a structure. The piles work together to distribute the weight and loads of the structure to the surrounding soil or rock.
- Most pile foundations contain group of piles instead of single pile The supporting capacity of a group of 'n'similar piles in many cases (not in all cases)is <'n'times the capacity of a single pile- reason being the zone of soil or rock stressed by the entire group extends to much greater width and depth, than that by a single pile.

PILE GROUP BEHAVIOR IN SAND

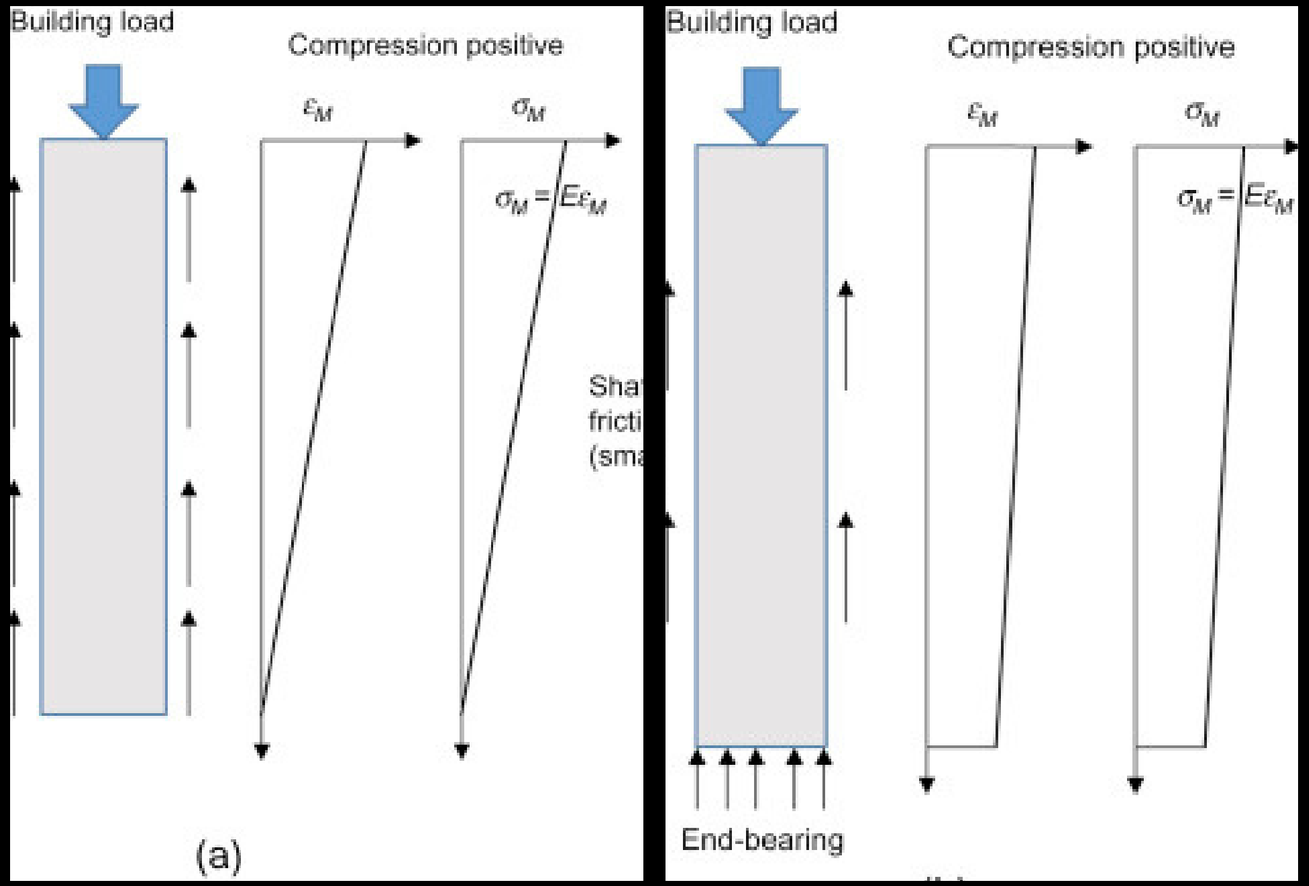
- Higher group efficiency due to better load distribution.
- Installation practice: Start driving piles at the center and move outward to minimize soil disturbance.
- Proper sequencing improves performance.





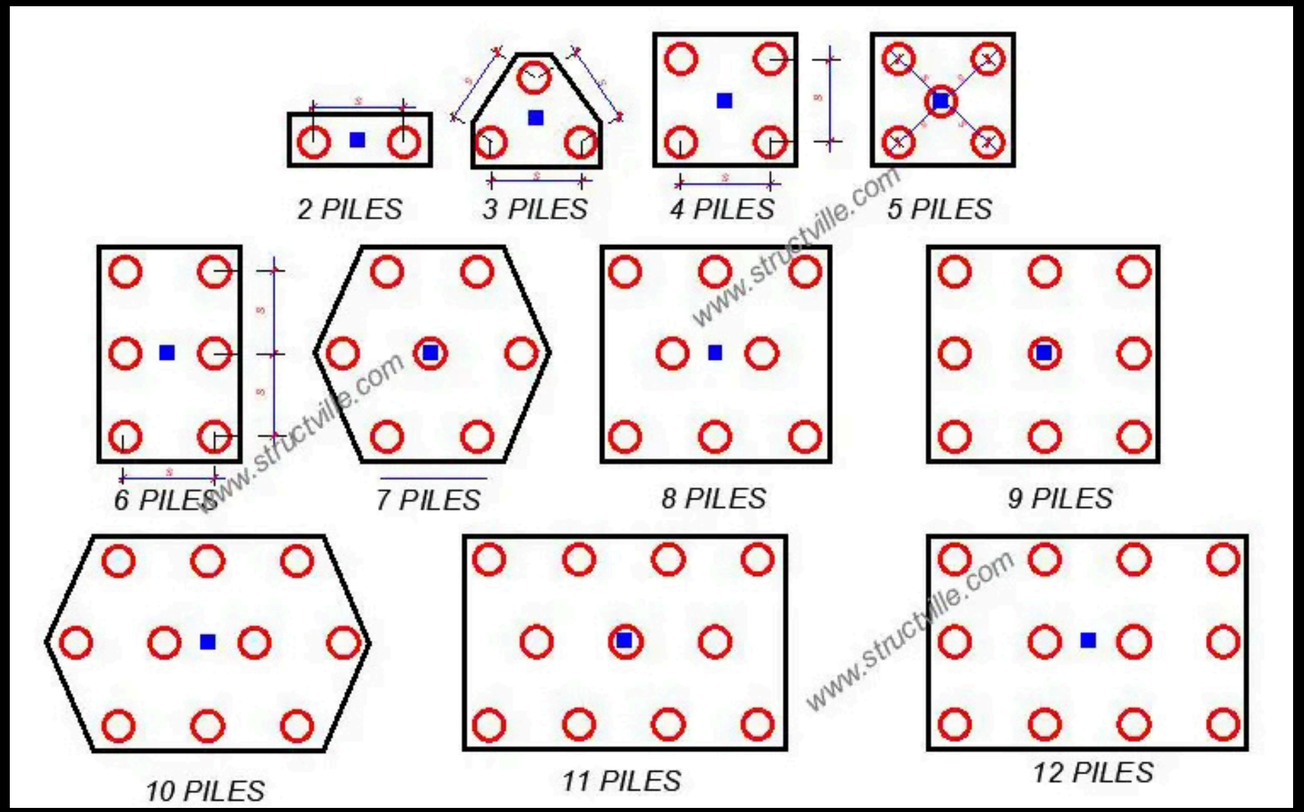
FRICTION PILES IN SAND

- Group Efficiency Formula: $\eta_g = \left(\frac{A_g}{A_i}\right) \times 100$
- Where:
  - η_g = Group Efficiency
  - A_g = Area of group
  - A_i = Sum of individual pile areas
- Friction piles rely on side resistance for load transfer.



PILE GROUP BEHAVIOR IN CLAY

- Pile groups act as a single large block.
- Block behavior results in lower group efficiency.
- Important to account for group interaction during design.



FRICTION PILES IN CLAY

Friction piles are a type of deep foundation that transfers loads to the surrounding soil through skin friction along the pile shaft. In clay soils, friction piles rely on the adhesion between the pile surface and the clay to resist loads.

Characteristics

1. Skin Friction: Friction piles in clay derive their load-bearing capacity primarily from skin friction along the pile shaft.
2. Adhesion: The adhesion between the pile surface and the clay soil provides resistance to loads.
3. Pile Length: Longer piles can increase skin friction and load-bearing capacity.

Thank You

FOR YOUR ATTENTION

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