

state the assumptions of Terzaghi's bearing capacity analysis.

Terzaghi's bearing capacity theory is a widely used method for estimating the ultimate bearing capacity of shallow foundations. The theory is based on several assumptions that are listed below:

1. Homogeneous soil: The soil beneath the foundation is assumed to be homogeneous, isotropic, and horizontally stratified.

2. Semi-infinite soil: The soil layer below the foundation is assumed to be semi-infinite and extends to a great depth.

3. Elastic soil: The soil is assumed to be elastic and obeying Hooke's law.

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4. Plane strain conditions: The foundation is assumed to be infinitely long in the horizontal direction and the soil deformation is assumed to be in the vertical plane perpendicular to the foundation.

5. Shallow foundations: The foundation is assumed to be a shallow foundation, i.e., the depth of foundation is less than the width of the

foundation.

6. *Rough contact between foundation and soil:* The contact between the foundation and the soil is assumed to be rough, and no slip is assumed to occur between them.

7. *Vertical load only:* The analysis assumes that the load on the foundation is purely vertical and there are no horizontal or inclined loads.

8. *Failure criterion:* The soil is assumed to fail according to Mohr-Coulomb failure criterion.

It's important to note that these assumptions may not be valid in all cases, and the actual behavior of the soil-foundation system may be more complex. Therefore, Terzaghi's bearing capacity theory is typically used as a preliminary design tool, and more detailed soil testing and analysis is often required for a more accurate estimation of foundation capacity.