What is Bearing Capacity?

Worksheet

Bearing capacity is the safe load per unit area that soil can carry: q = P/A. It depends on soil cohesion, friction angle, foundation depth and width.

q = P / A

Questions

1. Foundation 2.5 m 2.5 m, load 1000 kN. Bearing capacity?

A) 125 kPa
B) 160 kPa
C) 200 kPa
D) 250 kPa

2. Bearing capacity formula:

A) q = A/P
B) q = P/A
C) q = P+A
D) q = PA

3. Which increases bearing capacity most?

A) Lighter load
B) Shallower depth
C) Higher friction angle
D) Smaller area

4. For 500 kN load, Area 8 m. Bearing capacity in kPa?

A) 62.5 kPa
B) 72.5 kPa
C) 82.5 kPa
D) 92.5 kPa

5. A 2 m 3 m foundation supports a 600 kN load. Calculate bearing capacity.

6. A square footing 1.5 m 1.5 m must support 450 kN. What is the bearing capacity?

7. A circular foundation (diameter 2.5 m) carries 800 kN. Find bearing capacity.

8. Define: What is bearing capacity?

9. Define: Bearing capacity formula?

10. Define: Unit of bearing capacity?

Answer Key

1. B) 160 kPa - A = 2.5 2.5 = 6.25 m; q = 1000 / 6.25 = 160 kPa.

2. B) q = P/A - Bearing capacity q (stress) = load P / area A.

3. C) Higher friction angle - Friction angle directly increases bearing capacity via Nq factor; shallower depth reduces it.

4. A) 62.5 kPa - q = 500 / 8 = 62.5 kPa.

5. A = 2 3 = 6 m q = P / A = 600 / 6 = 100 kPa

6. A = 1.5 1.5 = 2.25 m q = 450 / 2.25 = 200 kPa

7. A = (1.25) 4.91 m q = 800 / 4.91 163 kPa

8. The maximum safe load per unit area that soil can support without failure or excessive settlement.

9. q = P/A, where P is total load (kN) and A is foundation area (m).

10. kPa (kilopascals) or kN/m.