What is a Load Path?

Worksheet

A load path is the continuous structural route - slab/roof, beam, column, foundation, soil - through which loads are transferred; the load reaching a given member can be found with P = w A.

Questions

1. What is the primary purpose of tracing a structure's load path?

A) To choose a paint color
B) To ensure loads travel safely to the foundation
C) To calculate wind speed
D) To determine window size

2. In a typical gravity load path, which element usually comes right after the beam?

A) Foundation
B) Column
C) Roof
D) Soil

3. A column's tributary area is 5 m 4 m with a load of 4 kN/m. What load reaches the column?

A) 9 kN
B) 20 kN
C) 80 kN
D) 800 kN

4. Which term describes a break in a load path?

A) Redundancy
B) Discontinuity
C) Tributary area
D) Diaphragm

5. A floor slab carries 4 kN/m of combined dead and live load over a 5 m 4 m tributary area for an interior column. Find the load transferred to the column.

6. A roof carries a 1.5 kN/m snow load over a 30 m tributary area for an edge column. Find the load.

7. A beam carries a 6 kN/m total load over a 3 m tributary width and 6 m span (A = 18 m). Find the load at each support.

8. Define: What is a load path?

9. Define: Why must a load path be continuous?

10. Define: What is tributary area?

Answer Key

1. B) To ensure loads travel safely to the foundation - Load path tracing verifies loads are safely carried down to the foundation without overstressing any member.

2. B) Column - Beams transfer their load to columns, which carry it down to the foundation.

3. C) 80 kN - 4 (5 4) = 80 kN.

4. B) Discontinuity - A discontinuity interrupts the path, forcing loads onto unintended members.

5. A = 5 4 = 20 m P = w A = 4 20 = 80 kN

6. P = w A = 1.5 30 = 45 kN

7. Total load = 6 18 = 108 kN Each support = 108 / 2 = 54 kN

8. The continuous route through which loads travel from their point of application down to the foundation and ground.

9. A break anywhere causes local overstress or collapse - loads need an unbroken route to the ground.

10. The floor or roof area assumed to load a specific structural member.