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Loading Idealizations Tributary Loadings—When frames or other structural members are analyzed, it is necessary to determine how walls, floors, or roofs transmit load to the element under consideration. A one-way system is typically a slab or plate structure

- A one-way system is typically a slab or plate structure supported along two opposite edges
 Evemplose a slab of reinforced concrete with steel in
- > Examples: a slab of reinforced concrete with steel in one direction or with steel in both directions with a span ratio $L_2/L_1 > 2$
- A two-way system is typically defined by a Span ratio L₂/L₁ < 2 or if all edges are supported</p>











Loading Idealizations 4 kN/m 2 m 1 2 3 m 2 m 3 m 2 m 4 kN/m 2 m 2 m 2 mThe dead load on the roof is 100 lb/ft² -2 m 2 m



















Determinacy and Stability

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Application of the Equations of Equilibrium

Free-Body Diagram

- Disassemble the structure and draw a free-body diagram of each member.
- Supplementing a member free-body's diagram with a free-body diagram of the entire structure may be necessary.
- Remember that reactive forces common on two members act with equal magnitudes but opposite directions on their free bodies.
- Identify any two-force members

Application of the Equations of Equilibrium Free-Body Diagram - disassemble the structure and draw a free-body diagram of each member. Equations of Equilibrium - The total number of unknowns should be equal to the number of equilibrium equations

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Application of the Equations of Equilibrium

Equations of Equilibrium

- > Check if the structure is determinate and stable
- Attempt to apply the moment equation ΣM = 0 at a point that lies at the intersection of the lines of action of as many forces as possible
- When applying ΣF_x = 0 and ΣF_y = 0, orient the x and y axes along lines that will provide the simplest reduction of forces into their x and y components
- If the solution of the equilibrium equations yields a negative value for an unknown, it indicates that the direction is opposite of that assumed





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