Assignment 3

Problem 1: Foundations for an 8-story building

- Determine the forces in the foundation beams and columns.
- Calculate the maximum moment and shear in the foundation beams.
- Verify the stability of the foundation system.

Problem 2: Bridge Design

- Design a steel truss for a 100-meter span.
- Compute the stress on the steel members.
- Ensure the design meets the structural code requirements.

Problem 3: Concrete Structure

- Design a concrete slab for a 20x30-meter area.
- Calculate the reinforcement required.
- Check the slab for bending and shear.

Problem 4: Foundation Analysis

- Analyze the bearing capacity of the soil.
- Determine the settlement of the structure.
- Evaluate the foundation's response to dynamic loads.

Problem 5: Bridge Materials

- Select materials for the bridge deck.
- Consider the durability and maintenance requirements.
- Estimate the life cycle cost of the bridge.

Problem 6: Concrete Slab Design

- Design a reinforced concrete slab for a parking garage.
- Calculate the deflection under service loads.
- Verify the slab design for fire resistance.

Problem 7: Foundation Stability

- Evaluate the stability of a deep excavation.
- Determine the bearing capacity of the strata.
- Implement a slope stability analysis.

Problem 8: Bridge aesthetics

- Design a visually appealing bridge.
- Consider environmental and ecological impacts.
- Develop a construction plan for the bridge.

Problem 9: Concrete bridge deck

- Design a prestressed concrete bridge deck.
- Calculate the stresses and strains.
- Ensure the design is serviceable under permanent loads.

Problem 10: Foundation installation

- Plan the installation of a pile foundation.
- Consider pile driving techniques and equipment.
- Evaluate the performance of the pile installation.

Problem 11: Concrete slab fire resistance

- Design a fire-resistant concrete slab.
- Calculate the fireproofing requirements.
- Ensure the slab meets fire protection standards.