Answer Key: Civil Engineering Licensure Exam – Mock Exam (Day 33: Structural Loads – Dead, Live, Wind, and Earthquake)

February 24, 2025

Answer Key

Section A: Multiple Choice Solutions

1. Dead loads refer to: **(a) The permanent loads such as walls, floors, and beams**
2. Live loads in buildings: **(b) The variable loads such as furniture, people, and equipment**
3. Wind loads are primarily affected by: **(b) The height and shape of the structure**
4. Base shear in earthquake analysis: **(a) The mass and stiffness of the structure**
5. Fundamental period in seismic analysis: **(c) The time it takes for a building to complete one cycle of oscillation during an earthquake**

Section B: Problem-Solving Solutions

1. Dead load of the slab:

$$DL = \text{thickness} \times \text{unit weight}$$

$$= 0.2 \times 24 = 4.8 \text{ kN/m}^2$$

2. Total live load on the floor:

$$LL = \text{live load per unit area} \times \text{floor area}$$

$$= 2.0 \times 100 = 200 \text{ kN}$$

3. Wind force on the building:

$$F = \text{wind pressure} \times \text{exposed area}$$

$$= 1.5 \times (30 \times 100)$$

$$= 1.5 \times 3000 = 4500 \text{ kN}$$

4. Base shear force due to earthquake:

$$V = C_s W$$

$$= 0.2 \times 5000 = 1000 \text{ kN}$$

5. Height of the building using empirical formula:

$$T = 0.075 H^{3/4}$$

$$1.5 = 0.075 H^{3/4}$$

Solving for H:

$$H = \left(\frac{1.5}{0.075} \right)^{\frac{4}{3}}$$

$$= (20)^{\frac{4}{3}}$$

$$= 37.8 \text{ m} \approx 38 \text{ m}$$