Answer Key: Civil Engineering Licensure Exam – Mock Exam (Day 25: Equipment Management and Labor Productivity)

February 24, 2025

Answer Key

Section A: Multiple Choice Solutions

1. Primary goal of equipment management: **(b) Maximize equipment utilization and efficiency**
2. Equipment depreciation refers to: **(b) The decrease in equipment value due to wear and tear**
3. Measure of labor productivity: **(a) Output per unit of time**
4. Utilization rate of equipment is calculated as: **(a) The ratio of actual operating hours to available hours**
5. A major factor affecting labor productivity: **(a) Weather conditions**

Section B: Problem-Solving Solutions

1. Annual depreciation using the straight-line method:

$$D = \frac{\text{Initial Cost} - \text{Salvage Value}}{\text{Life Span}}$$

$$= \frac{250,000 - 30,000}{8}$$

$$= \frac{220,000}{8} = 27,500 \text{ per year}$$

2. Labor productivity:

$$\text{Productivity} = \frac{\text{Total Output}}{\text{Total Workers} \times \text{Total Days}}$$

$$= \frac{5,000}{50 \times 25}$$

$$= \frac{5,000}{1,250} = 4 \text{ square meters per worker per day}$$

3. Utilization rate:

$$U = \frac{\text{Actual Hours Used}}{\text{Scheduled Hours}} \times 100\%$$

$$= \frac{30}{40} \times 100 = 75\%$$

4. Concrete mixer output:

$$\text{Total Weekly Output} = \text{Production Rate} \times \text{Hours per Day} \times \text{Days per Week}$$

$$= 10 \times 6 \times 5$$

$$= 300 \text{ cubic meters per week}$$

5. Estimated completion time with 12 workers:

$$\text{Work Rate} = \frac{\text{Total Work}}{\text{Total Time} \times \text{Total Workers}}$$

$$= \frac{500}{20 \times 10} = 2.5 \text{ meters per worker per day}$$

$$\text{New Time} = \frac{500}{12 \times 2.5} = \frac{500}{30} = 16.67 \approx 17 \text{ days}$$