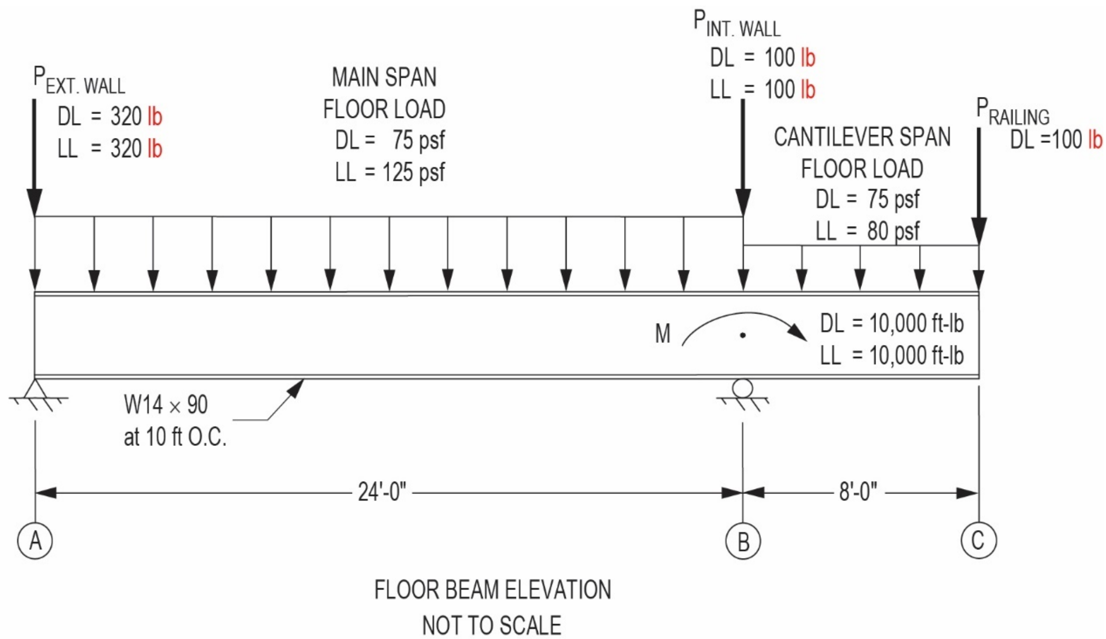
ERRATA for
PE Civil: Structural Practice Exam

ISBN: 978-1-947801-31-8

Errata posted 03/03/2025

Revisions are shown in red.

Question 11, p. 11:



○ A. 1.96

○ B. 2.13

○ C. 21.7

○ D. 24.8

Question 31, p. 23:
An A992 W8×28 beam is loaded as shown. To have zero deflection at the free end of the overhanging section, the magnitude (kips) of the concentrated force, **P**, at the free end must be __________. Ignore member self-weight.

Question 36, p. 26:
A contractor is planning to install a temporary structure that will support a concrete pump at a construction site. According to the construction contract, the contractor must submit design drawings and calculations for the temporary structure to the project engineer of record for approval. What is the purpose of this submittal requirement?

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Question 37, p. 27:
According to IBC 2018 and applicable quality assurance inspection requirements, which of the following inspection tasks are required for ASTM A325 high-strength bolts in a snug-tightened joint used in a steel-framed structure?

Question 51, p. 36:
Per ASCE 7-16, the estimated design lateral soil load (psf/foot of depth) for nonrigid walls is most nearly:

Question 57, p. 40:
Using ACI 318-14's simplified method of analysis, the maximum factored negative moment in the slab (ft-kips/ft) is most nearly:

○ C. 1.62

Question 63, p. 46:
The figure shows a cast-in-place reinforced concrete spread footing for an interior column that is concentrically loaded. Punching shear controls the footing thickness in the design. Neglecting the shear strength of reinforcing and using normal weight concrete, the design punching shear capacity of the footing (kips) per ACI 318-14, is most nearly:

Question 65, p. 48:
Option B should read as follows:
○ B. ASD = 21.3
LRFD = 32.1

Question 74, p. 52:
For the figure shown, unfactored vertical reactions from the grade beam to the drilled pier are LL = 10 kips and DL = 8 kips. According to ASCE 7-16, the **minimum** horizontal design strength (lb) of the connection from the grade beam to the drilled pier is most nearly:

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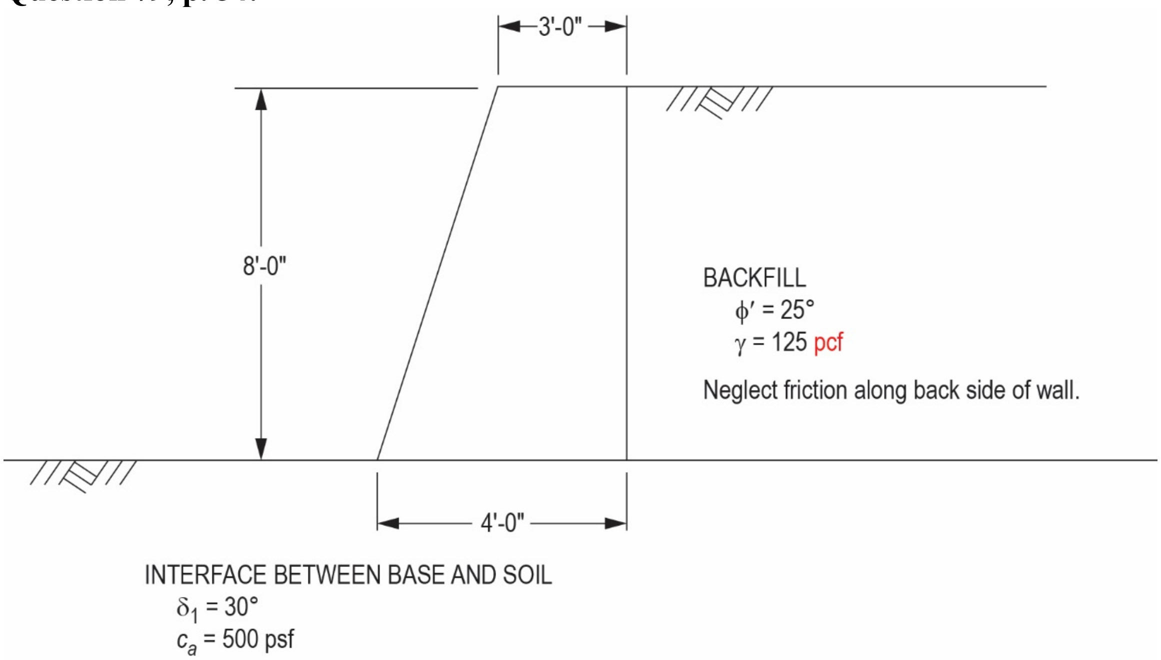
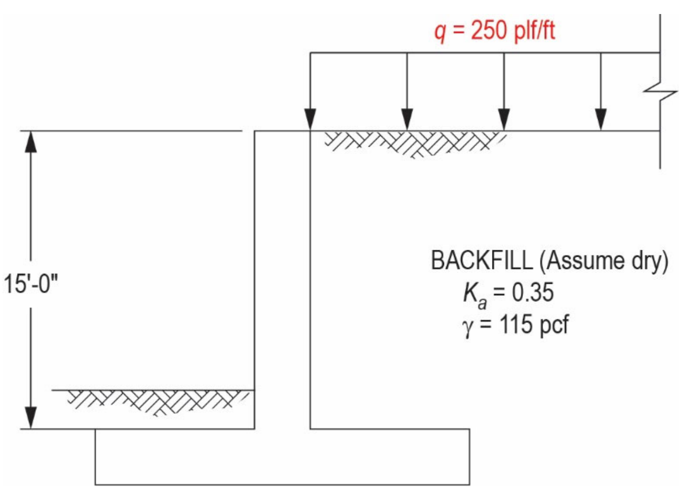
Question 79, p. 54:



Question 80, p. 55:



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Solution 11, p. 60:

$$R_a(24\text{ ft}) - 0.640\text{ kips}(24\text{ ft}) - 2\text{ klf}(24\text{ ft})^2/2 + 20\text{ ft-kips} + 1.55\text{ klf}(8)^2/2 + 0.1\text{ kips}(8\text{ ft})$$

$$R_a(24\text{ ft}) - 15.36\text{ ft-kips} - 576\text{ ft-kips} + 20\text{ ft-kips} + 49.6\text{ ft-kips} + 0.8\text{ ft-kips}$$

$$R_a = \frac{-520.96\text{ ft-kips}}{24\text{ ft}} = -21.7\text{ kips}$$

Solution 57, p. 78:

$$l_n = 10\text{ ft} - 1\text{ ft} = 9\text{ ft per Sec. 6.5}$$

$$W_u = 1.2\times 100 + 1.6\times 50 = 200\text{ plf}$$

Use $W_u l_n^2/10$ (max of all applicable support conditions)

Note: Beam/column stiffness not applicable to slabs

$$M_u = W_u l_n^2/10 = 1.62\text{ ft-kips/ft}$$

THE CORRECT ANSWER IS: C

Solution 61, p. 79:
By inspection *P* controls. *P* is limited by the yielding of the horizontal leg of the angle. Use plate yielding limit state, per section F11.1.

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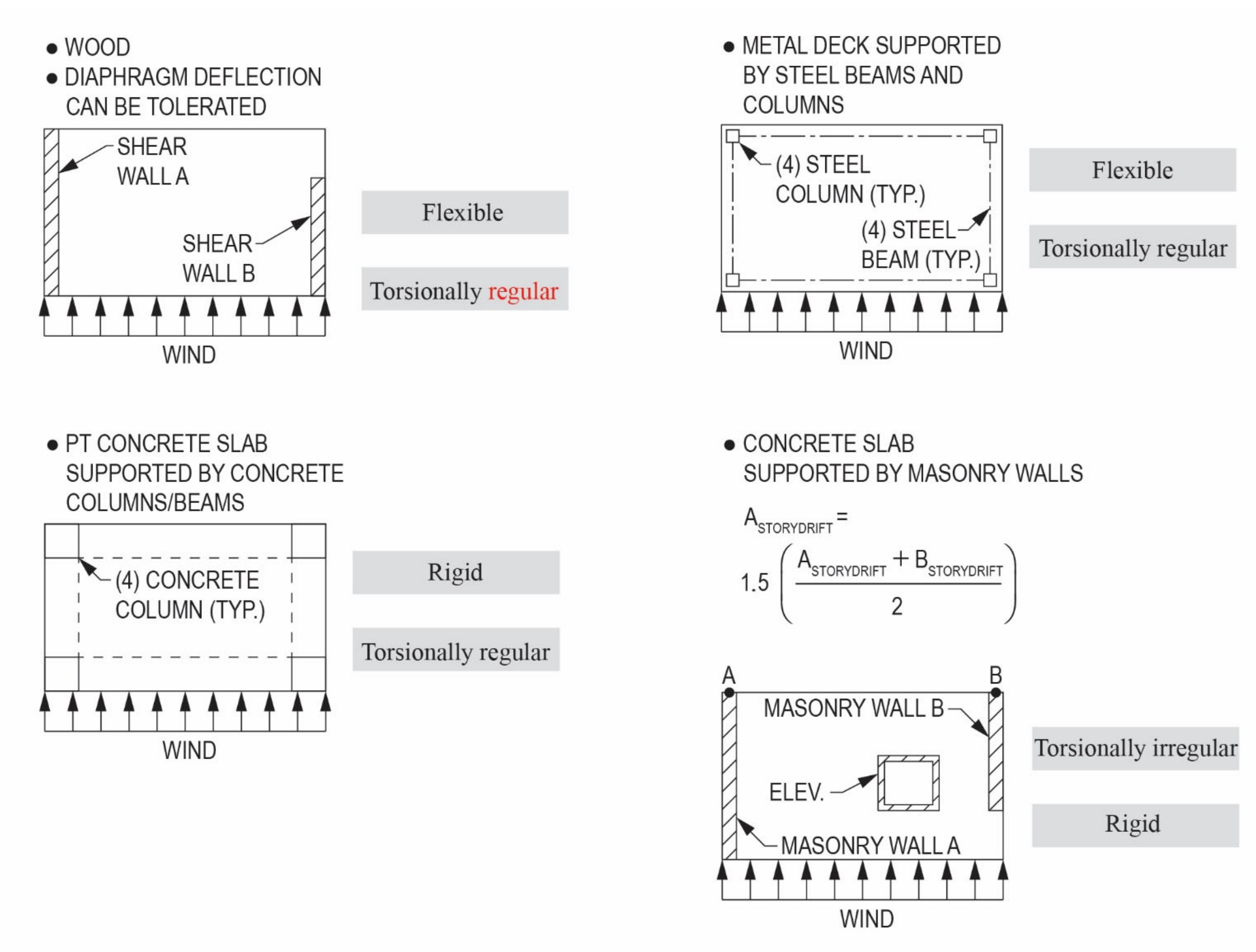
Solution 62, p. 80:



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Solution 63, p. 81:

Per ACI 318-14, Section 8.5.3.1.2, two-way shear, v_n, shall be calculated in accordance with Section 22.6.

Per Section 22.6.1.2, $v_n = v_c + v_s$ (disregard v_s per problem statement).

Per Section 22.6.5.2, Table 22.6.5.2, Section 22.6.5.3, use smallest of the following to calculate v_c:

a. $\left(2+\frac{4}{1/1}\right)=6\lambda\sqrt{f_c'}$

b. $\left[\frac{(40)(20\text{ in.})}{128\text{ in.}}+2\right]=8.3\lambda\sqrt{f_c'}$

c. $4\lambda\sqrt{f_c'}$ Controls

For ϕ values, see Table 21.2.1.

For λ, see Section 19.2.4.

$$\begin{aligned}\phi v_n &= 0.75(4)(1)(\sqrt{3,000})(128\text{ in.})(20\text{ in.})\\ &= 420.6\text{ kips}\end{aligned}$$

Solution 65, p. 81:

Reference: AISC,15th ed.

$R_n = F_n A_b$ Equation J3-1

$\phi = 0.75,\ \Omega = 2.00$

ASD:

$F_{nv} = 27\text{ ksi}$ $F_{nv}/\Omega = 13.5\text{ ksi}$ Table J3.2

Allowable load $= 2(13.5)(0.79) = 21.33$ kips

LRFD:

$\phi R_n = \phi F_{nv}\ A_b$

$\phi F_{nv} = 20.3\text{ ksi (A307 bolts)}$

$\phi R_n = (20.3)(0.79)(2) = 32.07$ kips Alternate solution, use Table7-1

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Solution 74, p. 86:

Reference: ASCE 7-16, Section 12.1.4, p. 89 and Section 1.4.3, p. 4

Unfactored reactions from grade beam to drilled pier:

LL = 10 kips

DL = 8 kips

Solution 75, p. 86:

J 3.5 max edge distance 12(t) = 12(3/4) = 9 in., 6 in. maximum governs.

THE CORRECT ANSWERS ARE: A, D, F

Solution 79, p. 88:

$$P_h = \frac{K_a \gamma z^2}{2}$$

$$= \frac{0.40586(125 \text{ psf})(8 \text{ ft})^2}{2}$$

$$= 1{,}623 \text{ lb/ft}$$