CHAPTER 2

PROBLEM #2-1

1. $1.4\,D = 1.4(100) =$ ____ 140 PSF

2. $1.2D + 1.6L + 0.5(Lr \text{ or } S \text{ or } R)$

$1.2(100) + 1.6(70) + 0.5(30) =$ ____ 247 PSF ←

3. $1.2D + 1.6(Lr \text{ or } S \text{ or } R) + (0.5L \text{ or } 0.5W)$

$1.2(100) + 1.6(30) + 0.5(70) =$ ____ 203 PSF

4. $1.2D + 1.0W + 0.5L + 0.5(Lr \text{ or } S \text{ or } R)$

$1.2(100) + 1.0(0) + 0.5(70) + 0.5(30) =$ ____ 170 PSF

5. $1.2D + 1.0E + 0.5L + 0.2S$

$1.2(100) + 1.0(0) + 0.5(70) + 0.2(30) =$ ____ 161 PSF

6. $0.9D + 1.0W$

$0.9(100) + 1.0(0) =$ ____ 90 PSF

7. $0.9D + 1.0E$

$0.9(100) + 1.0(0) =$ ____ 90PSF

GOVERNING FACTORED LOAD = 247 PSF (CASE 2.)

NFC ✓

PROBLEM # 2-2

1. $1.4D = 1.4(12000) =$ ——— 16,800 lb

2. ——— DOES NOT CONTROL ———
(BY INSPECTION)

3. $1.2D + 1.6(L_r \text{ or } S \text{ or } R) + (0.5L \text{ or } 0.5W)$

$1.2(12{,}000) + 1.6(\phi) + 0.5(+52{,}000) =$ ——— 40,400 lb

4. $1.2D + 1.0W + 0.5L + 0.5(L_r \text{ OR } S \text{ or } R)$

$1.2(12{,}000) + 1.0(52{,}000) =$ ——— 66,400 lb ←

5. ——— DOES NOT CONTROL ———
(BY INSPECTION)

6. $0.9(D) + 1.0W$ (UPLIFT)

$0.9(12000) + 1.0(-52{,}000) =$ ——— $-41{,}200$ lb ←

7. ——— DOES NOT CONTROL ———
(BY INSPECTION)

MAXIMUM FACTORED LOADS:

+ 66,400 lb	CASE 4.
− 41,200 lb	CASE 6.

SFC ✓

PROBLEM # 2-3

1. $1.4D = 1.4(9000) =$ ——— 12,600 lb

2. $1.2D + 1.6L + 0.5(Lr \text{ or } S \text{ or } R)$

$1.2(9000) + 1.6(5000) + 0.5(2500) =$ ——— 20,050 lb ←

3. $1.2D + 1.6(Lr \text{ or } S \text{ or } R) + (0.5L \text{ or } 0.5W)$

$1.2(9000) + 1.6(2500) + 0.5(5000) =$ ——— 17,300 lb

4. $1.2D + 1.0W + 0.5L + 0.5(Lr \text{ or } S \text{ or } R)$

$1.2(9000) + 1.0(\phi) + 0.5(5000) + 0.5(2500) =$ —— 14,550 lb

5. $1.2D + 1.0E + 0.5L + 0.2S$

$1.2(9000) + 1.0(6500) + 0.5(5000) + 0.2(\phi) =$ — 19,800 lb

6. ——— DOES NOT CONTROL ———
(BY INSPECTION)

7. $0.9D + 1.0E$ (UPLIFT)

$0.9(9000) + 1.0(-6500) =$ ——— 1,600 lb

MAXIMUM FACTORED LOADS:

+ 20,050 lb CASE 2

NO UPLIFT

SFC ✓

PROBLEM # 2-4

1. $1.4\,D = 1.4\,(24) =$ _____ 33.6 PSF

2. $1.2\,D + 1.6\,L + 0.5\,(Lr \text{ or } S \text{ or } R)$

   $1.2\,(24) + 1.6\,(\emptyset) + 0.5\,(16) =$ _____ 36.8 PSF

3. $1.2D + 1.6\,(Lr \text{ or } S \text{ or } R) + (0.5\,L \text{ or } 0.5\,W)$

   $1.2\,(24) + 1.6\,(16) + 0.5\,(42) =$ _____ 75.4 PSF

4. $1.2\,D + 1.0\,W + 0.5\,L + 0.5\,(Lr \text{ or } S \text{ or } R)$

   $1.2\,(24) + 1.0\,(42) + 0.5\,(0) + 0.5\,(16) =$ _____ 78.8 PSF

5. _____ DOES NOT CONTROL _____
   (BY INSPECTION)

6. $0.9\,D + 1.0\,W$ (UPLIFT)

   $0.9\,(24) + 1.0\,(-42) =$ _____ -20.4 PSF

7. _____ DOES NOT CONTROL _____
   (BY INSPECTION)

MAXIMUM FACTORED LOADS:

+ 78.8 PSF CASE 4.

− 20.4 PSF CASE 6.

SFC✓

PROBLEM # 2-5

D = 64 PSF L = 100 PSF

BEAM SPACING = 7 1/6"

D(PLF) = 64(7.5) = 480 PLF

L(PLF) = 100(7.5) = 750 PLF

1. 1.4 D = 1.4 (480) = _____ 672 PLF

2. 1.2 D + 1.6 L + 0.5 (Lr or S or R)

   1.2 (480) + 1.6 (750) = _____ 1776 PLF ←

3. 1.2 D + 1.6 (Lr or S or R) + (0.5L or 0.5W)

   1.2 (480) + 0.5 (750) = _____ 951 PLF

4. 1.2 D + 1.0 W + 0.5L + 0.5 (Lr or S or R)

   1.2 (480) + 0.5 (750) = _____ 951 PLF

5. 1.2 D + 1.0 E + 0.5 L + 0.2 S

   1.2 (480) + 0.5 (750) = _____ 951 PLF

6. 0.9 D + 1.0 W (NO UPLIFT)

   0.9 (480) = _____ 432 PLF

7. 0.9 D + 1.0 E (NO UPLIFT)

   0.9 (480) = _____ 432 PLF

MAXIMUM FACTORED LOAD = 1776 PLF CASE 2.

SFC ✓

PROBLEM # 2-6

D = 20 PSF S = 12 PSF, L_r = 18 PSF, W = 38 PSF ↑ (-)
16 PSF ↓ (+)

BEAM SPACING = 6'-0"

D (PLF) = 20(6) = 120 PLF
S (PLF) = 12(6) = 72 PLF
L_r (PLF) = 18(6) = 108 PLF
W (PLF) = -38(6) = -228 PLF
OR = +16(6) = 96 PLF

1. 1.4D = 1.4(120) = _____ 168 PLF
2. 1.2 D + 1.6L + 0.5(L_r or S or R)
   1.2(120) + 0.5(108) = _____ 198 PLF
3. 1.2D + 1.6(L_r or S or R) + (0.5L or 0.5W)
   1.2(120) + 1.6(108) + 0.5(96) = _____ 364.8 PLF ←
4. 1.2D + 1.0W + 0.5L + 0.5(L_r or S or R)
   1.2(120) + 1.0(96) + 0.5(108) = _____ 294 PLF
5. 1.2D + 1.0E + 0.5L + 0.2S
   1.2(120) + 0.2(72) = _____ 158.4 PLF
6. 0.9D + 1.0W (UPLIFT)
   0.9(120) + 1.0(-228) = _____ -120.0 PLF ←
7. ____ DOES NOT CONTROL - BY INSPECTION

MAXIMUM FACTORED LOADS:

364.8 PLF CASE 3. DOWNWARD
-120.0 PLF CASE 6. UPWARD

SFC ✓

PROBLEM # 2-7

1. D = 100 = _____ 100 PSF

2. D+L = 100 + 70 = _____ 170 PSF

3. D + (Lr or S or R) = 100 + 30 = _____ 130 PSF

4. D + 0.75(L) + 0.75(Lr or S or R)

   100 + 0.75(70) + 0.75(30) = _____ 175 PSF ←

5. D + (0.6W or 0.7E) = 100 + 0 _____ 100 PSF

6a. D + 0.75L + 0.75(0.6W) + 0.75(Lr or S or R)

   100 + 0.75(70) + 0 + 0.75(30) _____ 175 PSF

6b. D + 0.75L + 0.75(0.7E) + 0.75(S)

   100 + 0.75(70) + 0 + 0.75(30) _____ 175 PSF

7. 0.6D + 0.6W (UPLIFT)

   0.6(100) + 0 _____ 60 PSF (NO UPLIFT)

8. 0.6D + 0.7E (UPLIFT)

   0.6(100) + 0 _____ 60 PSF (NO UPLIFT)

GOVERNING LOAD = 175 PSF CASE 4.

SFC ✓

PROBLEM # 2-8

1. $D = 12000 =$ _____ 12,000 lb

2. $D + L = 12,000 =$ _____ 12,000 lb

3. $D + (Lr \text{ or } S \text{ or } R) = 12,000 =$ _____ 12,000 lb

4. $D + 0.75L + 0.75(Lr \text{ or } S \text{ or } R)$

$12,000 =$ _____ 12,000 lb

5. $D + (0.6W \text{ or } 0.7E)$

$12,000 + 0.6(52,000) =$ _____ 43,200 lb ←

6a. $D + 0.75L + 0.75(0.6W) + 0.75(Lr \text{ or } S \text{ or } R)$

$12,000 + 0 + 0.75(0.6)52,000 + 0 =$ ____ 35,400 lb

6b. $D + 0.75L + 0.75(0.7E) + 0.75(S)$

$12,000 + 0 =$ _____ 12,000 lb

7. $0.6D + 0.6W$ (UPLIFT)

$0.6(12,000) + 0.6(-52,000) =$ ____ -24,000 lb (UPLIFT)

8. $0.6D + 0.7E$

$0.6(12,000) + 0 =$ _____ 7,200 lb (NO UPLIFT)

GOVERNING LOADS:

+ 43,200 lb CASE 5.

- 24,000 lb CASE 7.

SFC ✓

PROBLEM # 2-9

1. $D = 9000 =$ ——— 9,000 lb

2. $D + L = 9000 + 5000 =$ ——— 14,000 lb

3. $D + (Lr \text{ or } S \text{ or } R) = 9000 + 2500 =$ ——— 11,500 lb

4. $D + 0.75L + 0.75(Lr \text{ or } S \text{ or } R)$

$9000 + 0.75(5000) + 0.75(2500) =$ ——— 14,625 lb

5. $D + (0.6W \text{ or } 0.7E)$

$9000 + 0.7(6500) =$ ——— 13,550 lb

6a. $D + 0.75L + 0.75(0.6W) + 0.75(Lr \text{ or } S \text{ or } R)$

$9000 + 0.75(5000) + 0 + 0.75(2500) =$ ——— 14,625 lb

6b. $D + 0.75L + 0.75(0.7E) + 0.75(Lr \text{ or } S \text{ or } R)$

$9000 + 0.75(5000) + 0.75(0.7)(6500) + 0.75(2500) =$ 18,037.5 lb ←

7. $0.6D + 0.6W$ UPLIFT

$0.6(9000) + 0 =$ ——— 5,400 lb (NO UPLIFT)

8. $0.6D + 0.7E$ UPLIFT

$0.6(9000) + 0.7(-6500) =$ ——— 850 lb (NO UPLIFT)

GOVERNING LOADS:

18,037.5 lb CASE 6a.

NO UPLIFT

SFC ✓

PROBLEM #2-10

1. $D = 24 =$ _____ 24 PSF

2. $D + L = 24 =$ _____ 24 PSF

3. $D + (L_r \text{ or } S \text{ or } R) = 24 + 16 =$ _____ 40 PSF

4. $D + 0.75L + 0.75(L_r \text{ or } S \text{ or } R)$

$24 + 0.75(16) =$ _____ 36 PSF

5. $D + (0.6W \text{ or } 0.7E)$

$24 + 0.6(42) =$ _____ 49.2 PSF

6a. $D + 0.75L + 0.75(0.6W) + 0.75(L_r \text{ or } S \text{ or } R)$

$24 + 0 + 0.75(0.6)(42) + 0.75(16) =$ _____ 54.9 PSF ←

6b. $D + 0.75L + 0.75(0.7E) + 0.75(L_r \text{ or } S \text{ or } R)$

$24 + 0 + 0 + 0.75(16) =$ _____ 36 PSF

7. $0.6D + 0.6W$ UPLIFT

$0.6(24) + 0.6(-42) =$ _____ −10.8 PSF ← UPLIFT

8. $0.6D + 0.7E$ UPLIFT

$0.6(24) + 0 =$ _____ 14.4 PSF (NO UPLIFT)

GOVERNING LOADS:

54.9 PSF CASE 6a.

−10.8 PSF CASE 7. UPLIFT

SFC ✓

PROBLEM # 2-11

$D = 64$ psf $L = 100$ psf

BEAM SPACING $= 7'6''$

$D\ (\text{PLF}) = 64(7.5) = 480$ PLF

$L\ (\text{PLF}) = 100(7.5) = 750$ PLF

1. $D = 480 =$ _____ 480 PLF

2. $D + L = 480 + 750 =$ _____ 1230 PLF ←

3. $D + (L_r \text{ or } S \text{ or } R) = 480 =$ _____ 480 PLF

4. $D + 0.75L + 0.75(L_r \text{ or } S \text{ or } R)$

$480 + 0.75(750) =$ _____ 1042.5 PLF

5. $D + (0.6W \text{ or } 0.7E) = 480 =$ _____ 480 PLF

6a. $D + 0.75L + 0.75(0.6W) + 0.75(L_r \text{ or } S \text{ or } R)$

$480 + 0.75(750) =$ _____ 1042.5 PLF

6b. $D + 0.75L + 0.75(0.7E) + 0.75(L_r \text{ or } S \text{ or } R)$

$480 + 0.75(750) =$ _____ 1042.5 PLF

7. $0.6D + 0.6W$ UPLIFT

$0.6(480) + 0 =$ _____ 288 PLF

8. $0.6D + 0.7E$

$0.6(480) + 0 =$ _____ 288 PLF

GOVERNING LOAD:
1230 PLF CASE 2.

SFC ✓

PROBLEM # 2-12

D = 20 PSF S = 12 PSF, Lr = 18 PSF, W = 38 PSF ↑ (-) 16 PSF ↓ (+)

BEAM SPACING = 6'-0"

D (PLF) = 20 (6) = 120 PLF
S (PLF) = 12 (6) = 72 PLF
Lr (PLF) = 18 (6) = 108 PLF
W (PLF) = -38 (6) = -228 PLF
+16 (6) = 96 PLF

1. D = 120 = _____ 120 PLF
2. D + L = 120 = _____ 120 PLF
3. D + (Lr or S or R) = 120 + 108 = _____ 228 PLF
4. D + 0.75L + 0.75 (Lr or S or R)
   120 + 0.75 (108) = _____ 201 PLF
5. D + (0.6W or 0.7E)
   120 + 0.6 (96) = _____ 177.6 PLF
6a. D + 0.75L + 0.75 (0.6W) + 0.75 (Lr or S or R)
   120 + 0 + 0.75 (0.6)(96) + 0.75 (108) = _____ 244.2 PLF ←
6b. D + 0.75L + 0.75 (0.7E) + 0.75 (Lr or S or R)
   120 + 0 + 0 + 0.75 (108) = _____ 201 PLF
7. 0.6D + 0.6W UPLIFT
   0.6 (120) + 0.6 (-228) = _____ -64.8 PLF
   UPLIFT

GOVERNING LOADS:

244.2 PLF CASE 6a.
-64.8 PLF CASE 7. UPLIFT

SFC ✓ 8. —— DOES NOT CONTROL (by Inspection) ——