CDR-1.6

RSB-4D L = 28'
W =

(See RSB.3)

1.73

M = 169.6
S = 67.9

R =
24.22

$\frac{826}{I}$ (Δ/1.1)

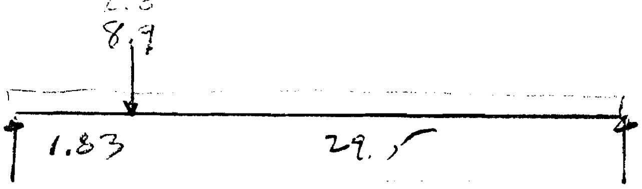
$\frac{826}{1.1} = 750$

$\frac{825}{.93} = 887$

W10×55

GIRDERS

RG-1



31.33

30.58 ×
.04 = 1.22
2,29

27.5
46.9

TL $\frac{1711.3}{1.90}$ 1141.2

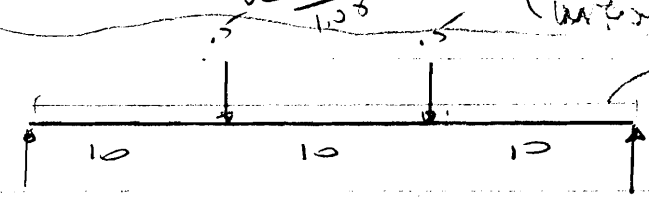
W $\frac{806}{1.08}$ 762

36.6

M - 36.6 (16) 585.6
− 2.29 ($\frac{16^2}{2}$) 293.12
292.48

W18×71 S = 127 I = 1170 S30 = 117 W21×57 S = 111 I = 1170

RG-2



2.29

18.3

17.7
34.35

34.88

M = 34.85 (15) = 522.75
− 2.29 ($\frac{15^2}{2}$) 257.63
− .5 (5) 12.5
252.62

959.3
Δ : TL $\frac{1439.2}{1.5}$ I =

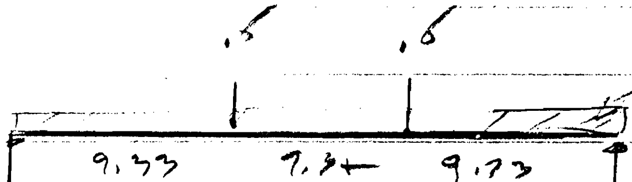
L/240
L/360 − 1

S30 = 101.05

W18×
111
1070

W21×57

RG-3



2.29

M − 32.6 (14) = 456.4
− 2.29 ($\frac{14^2}{2}$) = 224.4
− .5 (3.67) 1.8
230.2

32.6 $\frac{1092}{1.4}$ = 780
TL

32.6

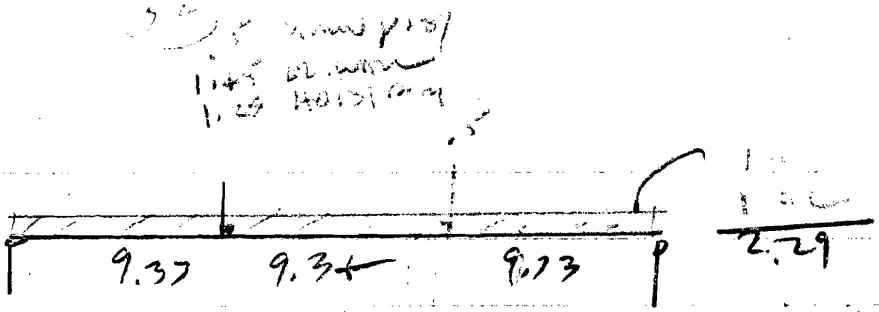
W18×60 S = 108

S30 = 92.1

W21×50 S = 94.8 I = 984

CDR-1.7

RG-4



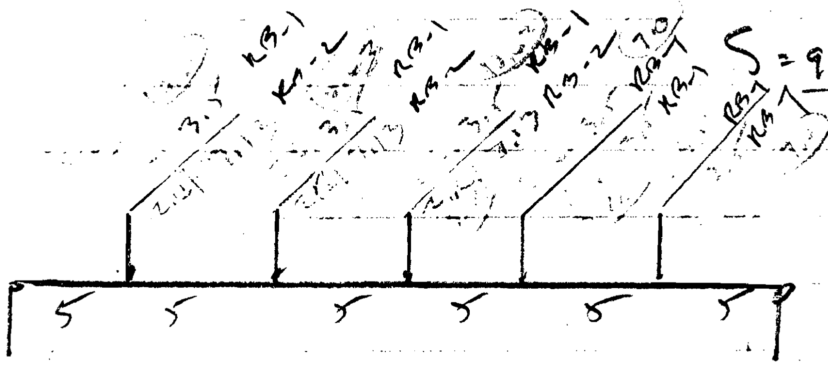
17.03
2.13
.17
19.33
34.36

17.03
1.47
18.43
33.46

M = 34.36 (13.6) = 467.3
2.29 (13.6² / 2) 211.8
- 3.2 (4.27) -13.7
241.3''

S = 96.72 W18x60

RG-5



8.83
7.09
5.32
2.33
1.07
24.77

17.05

37.82

1.77
3.54
5.32
4.07
5.33
21.13

34.48

M = 37.82 (15) 567.3
15.35 (10) 153.5
15.85 (5) 79.25
329.58

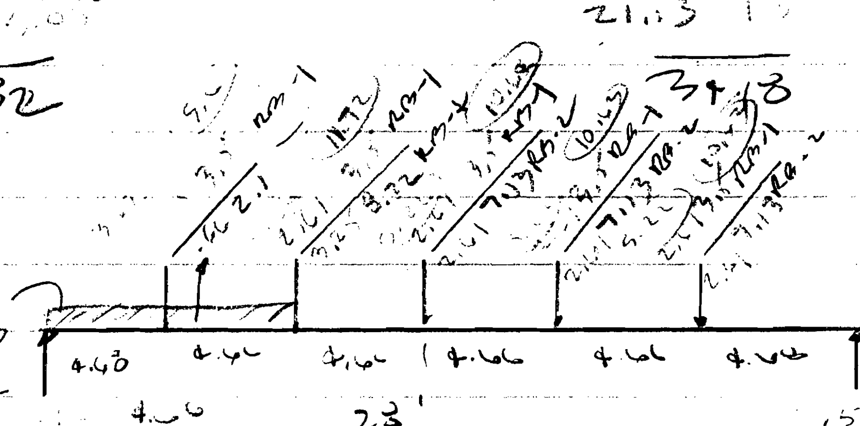
S = 131.82

Δ 2.48

1503 / 1.5 = 1006

W18x76

RG-6



(.115) .23
.34

4.06
7.31
5.32
3.55
1.78
23.12

11.85

34.97

.94
3.91
5.32
7.03
8.35
26.1

12.94

39.04

M = 34.97 (14) = 489.6
- 3.87 (9.32) = 82.7
- 17.53 (4.66) 82
324.9

S = 130

W18x76
S = 146
I = 1330

∅ 2.65'' 1244 / 114 = 9.93

S = 140
1080
W21x68

ELEVATOR ROOF

Typ Bm L = 8.5'

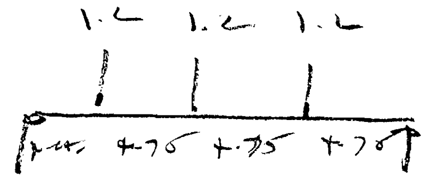
w = 5 (.050) = .275

LL = 35
R = 20
55

M = 6.5'

Use W8×13

R =



1.8 19 1.8

M = 1.8 (9.8) = 17.7

−1.2 (4.75) .5.7

11.4

S = 5.7

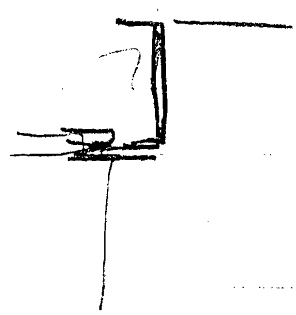
W10×19 S = 18.8

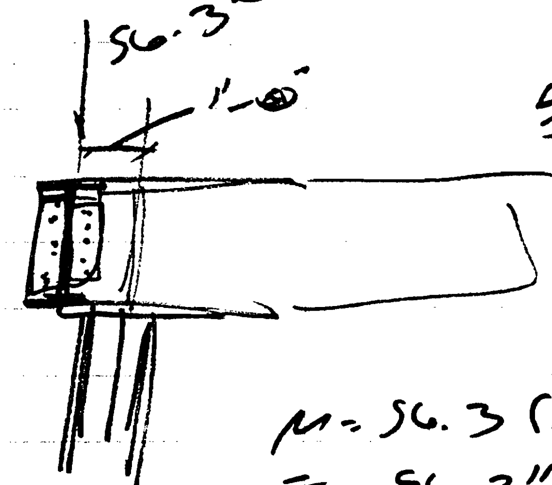
I = 96.3

Δ = 27.8 / .16 = 46.3

56.3 kips

21.7
34.6
56.3





M = 56.3 (1.0)

= 56.3"

50.1 S30 =

CD 4 . 1.0

FINAL DESIGN
4TH FLOOR / BASE

7.5 (.06) = .45
.978

4FB-1

(SEE PREVIOUS FB-2)

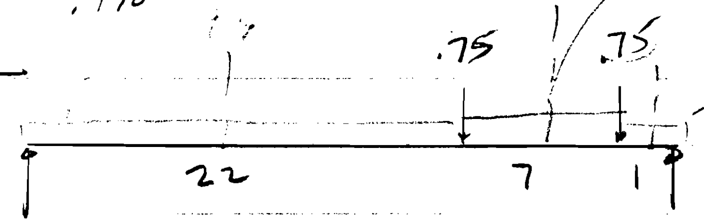
RAM BM

30' BAY

BM. @ 7.5' O.C.

30' LENGTH

CONN



6.27	3.63
.20	.55
.47	2.65
.03	.72
	.45
6.77	8.03
15.07	17.26

$M = 15.07 (15.46) = 233$

$- .978 \left(\frac{15.46^2}{2}\right) \quad 116.5$

116.5' K

$S_{30} = 46.6$

W16x26 @ 25% Comp. – Sb = 53 (8.5 studs min – USE 15 per RAM)

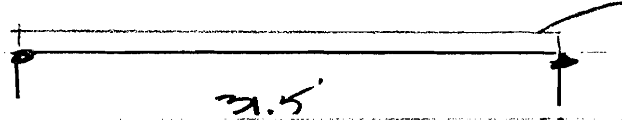
4FB-1A

30' W BAY

7.5' O.C.

L = 31'2"

ACTUAL



7.1	7.1
15.4	15.4

$M = 120.93$ k/ft

$S_{30} = 48.37$ – USE SAME BM. AS 4FB-1

4FB-2

28' W. BAY

7.0' O.C.

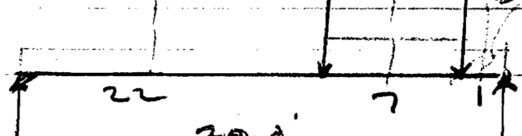
L = 30.0'

.42 / 1.12"

.7 (.06)

.42

.91



5.83	7.34
.19	.51
.44	2.50
.06	.68
	.42
6.50	7.5
14.07	16.1

$M = 14.07 (15.46) = 217.5$

$- .91 \left(\frac{15.46^2}{2}\right) \quad 108.8$

108.7

$S = 43.48$ – USE SAME BM AS 4FB-1

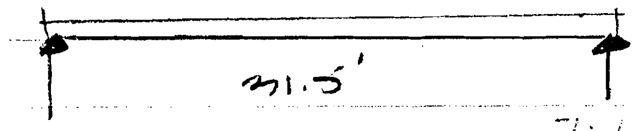
CD4-1.1

4FB-2A
28' W.Bay
7' o.c.
L=31'-6"
Down

.42 / .41

$M = 112.9$

$S = 43.2$



7.72 6.62 / 14.34" — 7.72 6.62 / 14.34"

USE SAME BM. AS 4FB-1

4FB-3

$L = 31.5' - w = 11/2$ (...) $R =$ ...

(.06) = ... — .715 ~ .72' — ... / 11.3

$M = 89.3$

$S_{30} = 35.72$ — USE SAME BM AS 4FB-1

4FB-4
NC

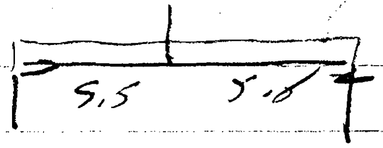
$L = 21.5' - w -$ .33 / .72

$M = 41.6$ $R =$ ... 3.55 / 7.67 ~ 7.7"

$S_{30} = 16.64$

W14×22 $S_x - 29$
(USE 10 STUDS)

4FB-5
NC



.06 P
.10 W
.16
.05
.21 "

$M = 5.06(5.5) = 27.83$
$- .21\left(\frac{5.5^2}{2}\right)$ 3.18
24.65"

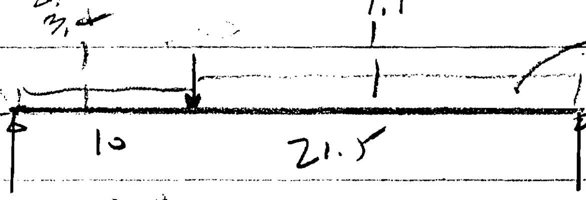
1.0 / .33 / 2.63 — 1.8 / .33 / 2.63

5.06 — 5.06

$S_{30} = 9.36$

USE W14×22
(USE 6 STUDS)

4FB-6



(5.5(.06) = .33 ... .385 / .718

$M = 12.74(17.82)$ 227.03
$- .717\left(\frac{17.82^2}{2}\right)$ 113.52
$S = 45.4$ 113.51

USE W16×31 [18]

1/2LL — 2.86 1.33 2.42 — 7.11 — 13.92

.54 1.35 4.62 — 6.07 — 12.74

4FB-7 Use Same As ~~4FB-1~~

1/2 C

4FB-8 L = 10.5' w = 12 [illegible] — M = 22.6

NG

4.5 [illegible] .24 9.04

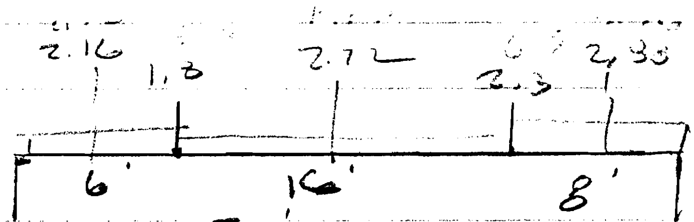
8 [illegible] .2 R = [illegible]

1.44 2.31

1.44 8.61

Use W12×19 (S_x = 21.3)
[6] Studs

4FB-9



30'

6 [illegible] .06 .36 .78

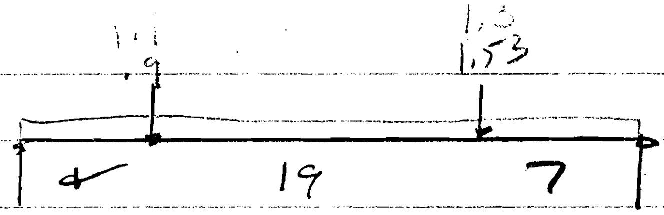
1.94	[illegible]	4 [illegible]	.22
1.44	[illegible]	[illegible]	.36
1.45	[illegible]	[illegible]	1.27
.61	[illegible]	[illegible]	1.69
.38	[illegible]	[illegible]	2.50
5.82	10.79	162	6.04
16.61			16.91

M = 16.61 (14.33) = 238.02
− 4.68 (11.33) 53.02
− 6.8 (8.33) 56.64
− .62 (8.33²/2) 21.51
106.38 S_{30} = 42.74
Use W16×31 [18]

4FB-10 Use W12×19

4 (.06) = .24
.10 1.53
.34
+ [illegible] (4.5) = 1.8

4FB-11



3(.1)
1.00 = .18
.1
1.23

4.2	4.2
.73	1.2
.36	1.17
5.37	5.49
11.21	11.52

M = 11.21 (15.9) = 178.24

− .58 (15.9² / 2) = 73.31

− 2.0 (11.9) = 23.8

81.13'k S_{30} = 32.6

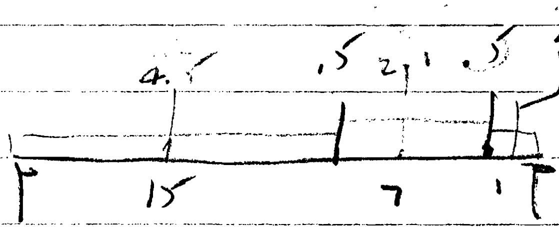
USE W16x31 (18)

FB-11A (USE W16x36)

R = 5.34

1.25 (4FB-11) 5.49 6.7

4FB-12



5 (.06) = .30
.674

3.07	1.47
.17	.33
.41	1.69
.02	.40
3.65	.30
7.36	4.67
	9.14

M = 7.36 (12.1) = 95.1

− .65 (12.1² / 2) = 47.6

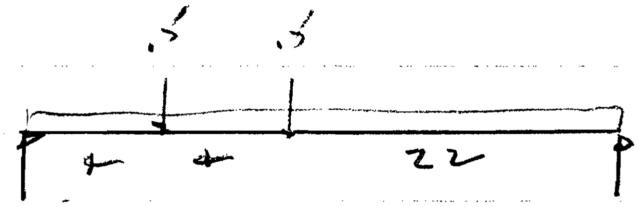
47.6

S = 19

USE W14x22

CM-1A

4FB-13



S: .1
.06 = .3
.184

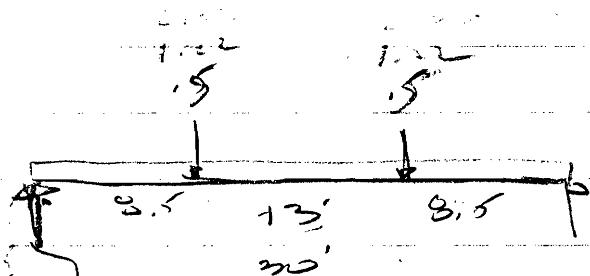
4.5 | 4.5
.39 | .27
.37 | .12
9.3 | 4.7
12.0 | 12.2

$M = 12.2(15.3) = 186.6$
$-.8\left(\frac{15.3^2}{2}\right)$ 93.6
93.2^K

$S_{30} = 37.2$

USE W16x26 [15]

4FB-14



2.5(.1)
.06 .15
1/2 C .40

4.5 x 4.5 x .1
.06
1.22

1.72 | 1.72
2.65 | 2.65
3.99 | 3.71
9.78 | 9.78

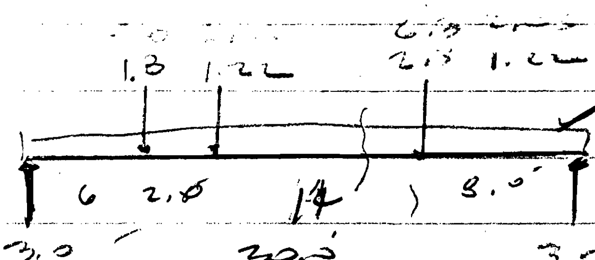
$M = 9.75(15) =$ 146.25
$-.14\frac{(15)^2}{2} =$ 45.0
$-3.75(6.5) =$ 24.4
76.9^K

$S_{30} = 30.8$

MIN 7 UMP $\frac{251.4}{1} = 251.4$

USE W16x31 [18]

4FB-9A
N/O



3.0 | 3.0
.64 | .36
.39 | .33
.61 | 1.69
.33 | .39
6.27 | 6.27
13.98 | 13.92

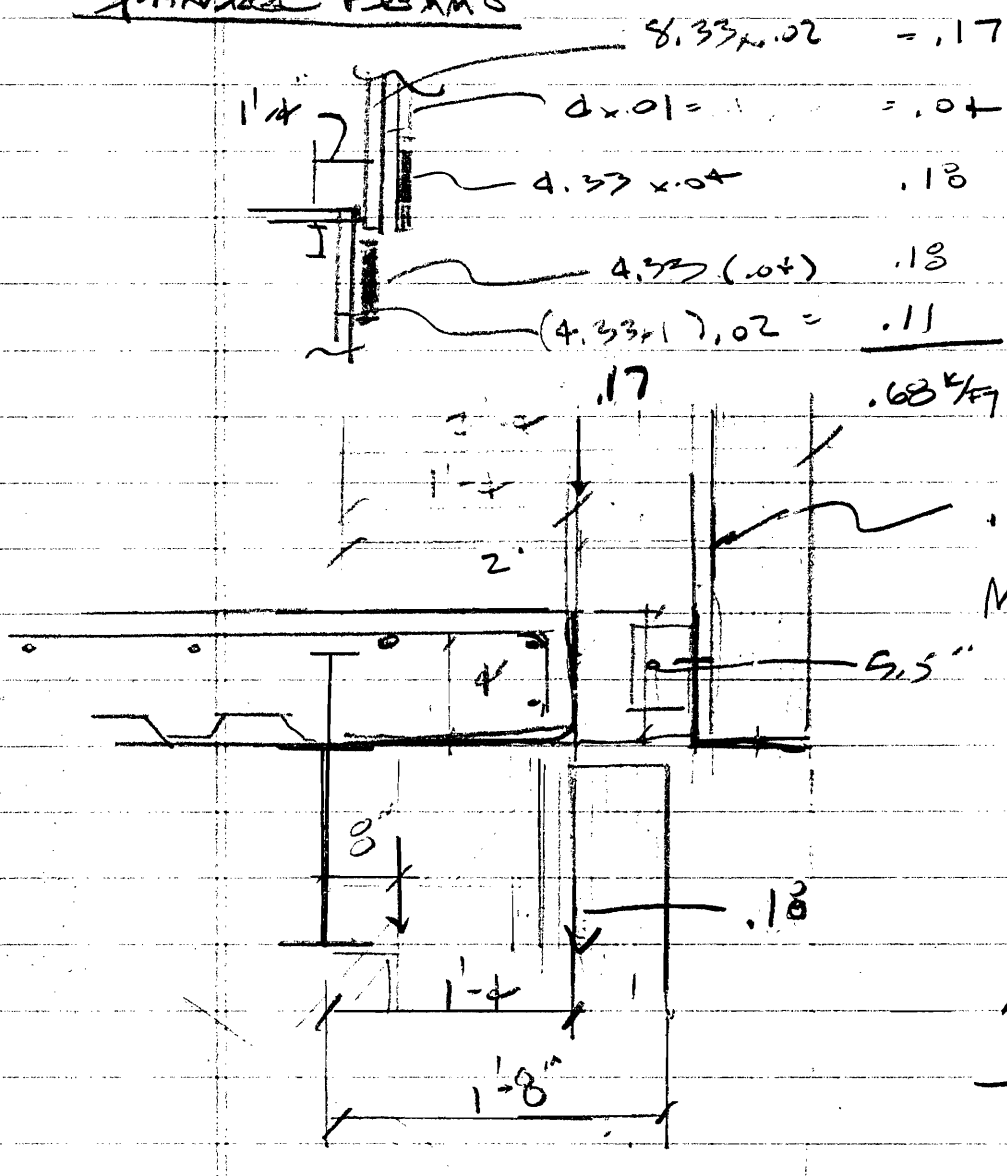
$M = 13.98(19.65)$ 274.7
$-.2\left(\frac{19.65^2}{2}\right)$ 38.6
$-6.8\ 13.65 =$ 92.8
$-3.28(11.65)$ 37.9
105.4

S=42.6

W16x36 Sx=56.5

CD+=1.5

SPANDREL BEAMS



.68 K/Ft. = 70 #/Ft.

M = .22 (2') = .44

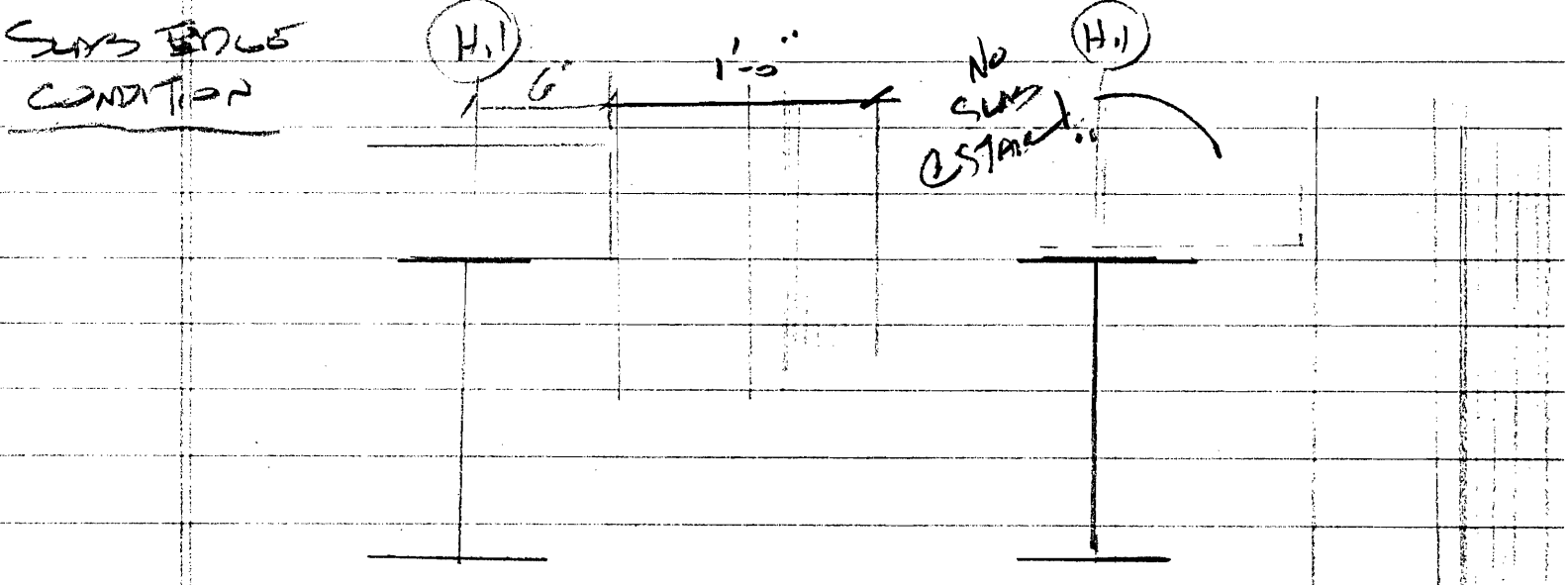
.17	(1.33)	.23
.18	(1.33)	.24
.11	(.67)	.08
		.9921.0 K/Ft

d = 4.5"

$A_s = \frac{1.0}{1.76\,(4.5)} = .126\ in^2/Ft.$

#4 @ 12" TOP BARS EACH WAY.

SLAB EDGE CONDITION



SPANNING BEAMS

4SB-2 L = 30' - W = 15.5 .17 1.33 = 17' x ... = 1.02 k/ft. R = 17.8 ... .7 = ... WALL

1/2 COMP

B = 16(5.5) + 7.5 =

KT + BMFL. - 95.5

M = 327.4

S_{30} = 130.9 (35) C+B 1.72 k/ft DL 25.8

W18x55 S_b = 139 [30.?] 2.91 k/ft TL 42.9

W21x50 [36] 1/2(C) I_{TL} 2039

1.27 W21 1.39

$TL \Delta = \frac{5(2.91) 30^4 1728}{384 (29,000) 2039}$ = .897" .85 L/401 (2196) .945 .906

$DL \Delta = \frac{5(1.72) 30^4 1728}{384 (29,000) 2039}$ = .53" L/679 > L/600 (2196)

RAM BM: W21x44 OPTIMUM (30) W18x46 [52] W18x55 [20] S ... = 149.93 OK I_{TL} = 2346

4SB-1 L = 28 W = ... R = ...

1.02

.72

... DL 24.1

2.42

M = 236.2"

S_{30} - 114.5 in³

W18x50 S_b = 126 [28]

1/2 C

Δ_{TL} = .737" L/456

I_{14} = 1890

DL = .434" L/774 OK

W21x44 S_b = 126 [36] - I = 1966 (C+B)

1 [70]

$\frac{1388}{1966}$ ≈ .71" TL L/473

CD4-1.7

456-3 C4+6

02 1/2 16+16

L = 31.5' w = 5.08' x .07

.02 .305

.70

1.33

3.76

6.23 M = 173.65

S_{30} = 69.5

Δ = 1069.6 / 1319 = .81"

W18x35 Sb = 88 [30] [360] B=d0

(1/2 C94) I_{14} = 1319

.15

.70 (.75)

456-4

NC

30'

.88 .93

M = 21.49 (16.6) = 354.6

− 6.84 (13.0) = 92.3

− 6.8 (10.6) = 71.4

− .7 (12.6/2) = 4.3

149.6

14.66 21.27

S_{30} = 59.84 ~~57.57~~

21.49

W18x40 S_x = 68.4

Lu = 16' S_{Lu} = 57.57(16) = 921.12

1" TL *

I MIN 908.3

W18x55 (890)

DL-WALL (8.33 + 4) x .04 = .494

(NO WINDOWS .02 .246

.74 ~ .75

.75" TL

I MIN = 1211

.81

I_M = 1120 *

* - FLOORS! UNIFORM!

W21x50

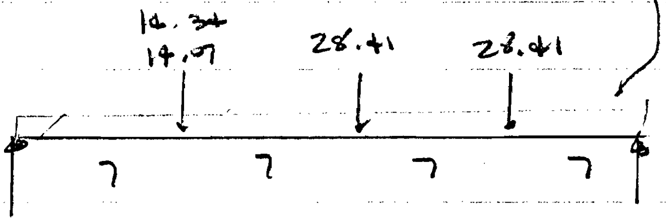
S = 94.6 I = 984

INTERIOR GIRDERS

(28.41)

4G-1

(PT. LD METHOD, UNIF. LD.)



42.62 | 23' | 42.62
25.76 | | 25.76
55.72 | | 55.72

2.14
1.84
3.98

M = 42.62 (14) = 596.68
− 28.41 (7) 198.87
397.81 ^1k

M = 1/8 (3.98) 23² =
390.04

~2%

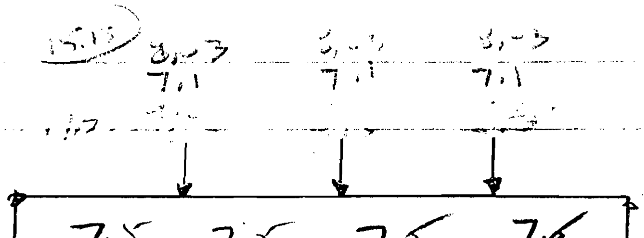
PT LD. S_{30} = 159.2
UNIF. 156.0 (~2%)

Q_{UNIF} = 1907.8 = 1363
TL → 1.4

W21x62 [58] S = 134

4G-2

L-30'

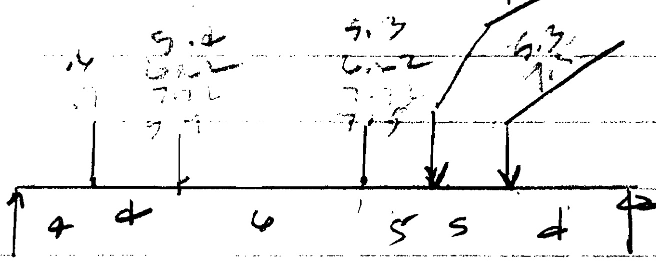


22.7 | 22.7
49 | 49

M = 49 (15) = 735
− 32.66 (7.5) 245
490 ^1k

S_{30} = 196
RAM → [24] 1.237"
W21x68 [56] .74"
S = 202

4G-1A



28'

.09 | .10
6.59 | 3.43 | 3.39
5.96 | 5.96 | 7.68
2.32 | 4.90 | 5.71
.76 | 4.54 | 6.43
21.72 | 16.14 | 17.92 | 24.74
37.86 | | 42.66

M = 37.86 (14) = 530.04
− 1.3 (10) = 13.0
− 25.64 (6) 153.84
363.2

S_{30} = 145.3
[66]
W21x62 [58] [59]

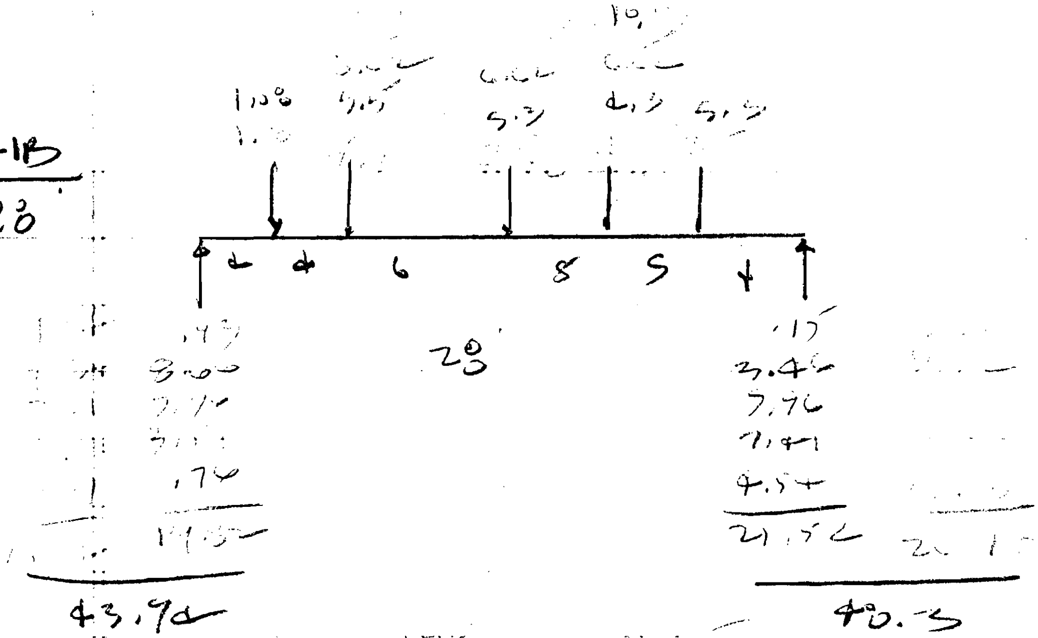
@ 27.9% · S = 162

CB = 1.0 CONS.
SIMPLE OK!

CD4-1.9

4G-1B

L=28

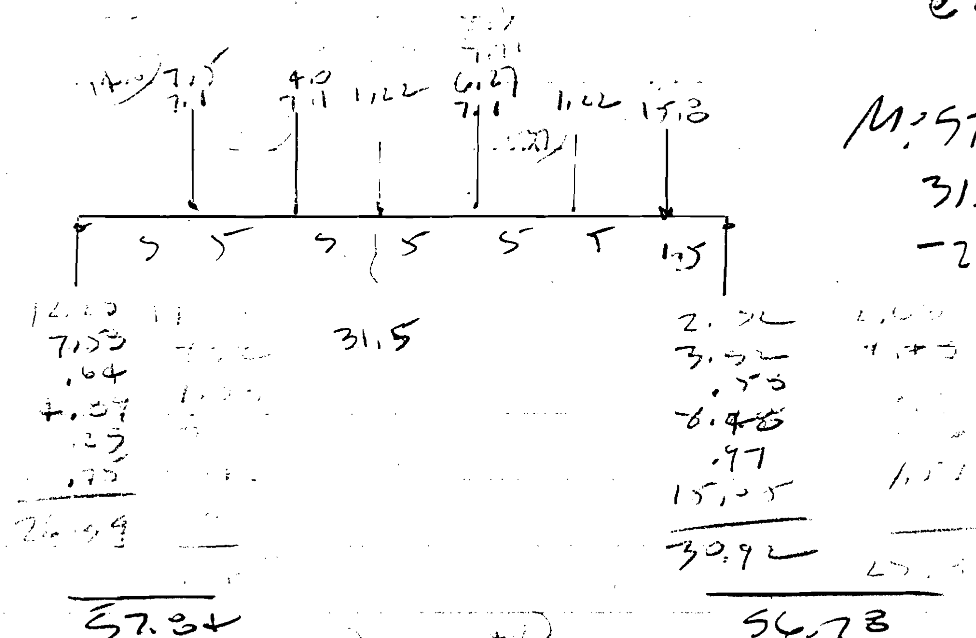


$M = 43.94(14) = 615.2$
$-2.88(10) = 28.8$
$-25.93(6) = 155.5$
431.1

$S_{30} = 172.44$

W21x68 [58]
@ 25.6% S=176

4G-3

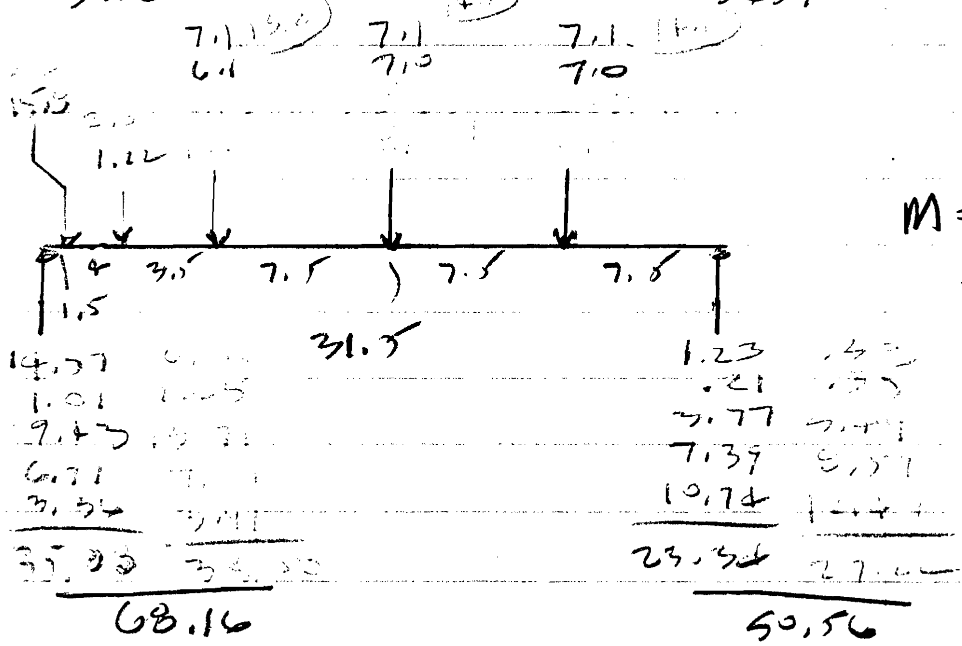


$M = 57.84(15) = 867.6$
$31.5(10) = 315$
$-25.2(5) = 126$
426.6

$S_{30} = 170.64$

W21x73
[38]

4G-4



$M = 50.56(15)\ 758.4$
$-30.5(7.5)\ 228.8$
$M\ 529.6$

$S_{30} = 211.84$

CHECK CONST. LOAD FOR GIRDERS

w = 31 (.05) = 1.55 k/ft DL
.02 = .62 LL
2.17 k/ft

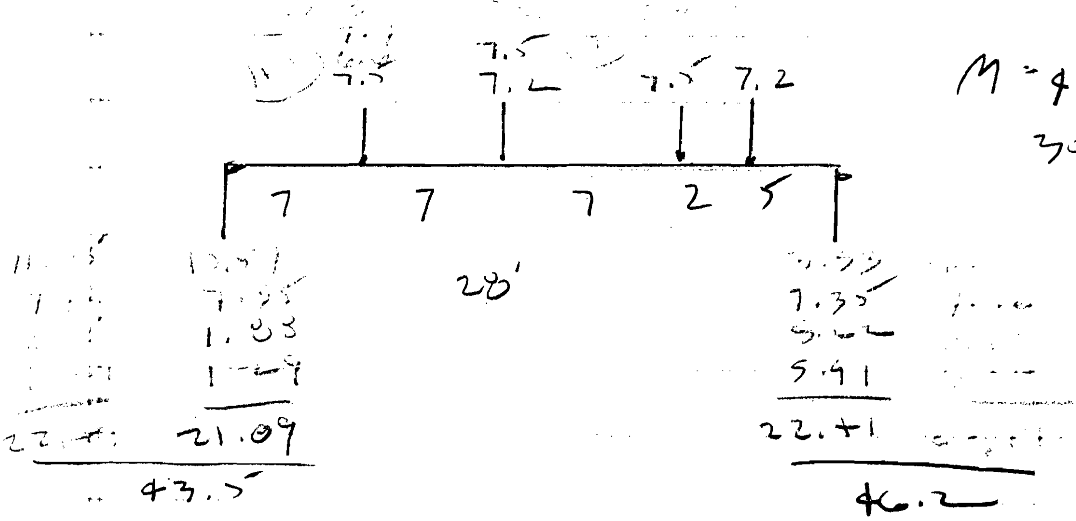
L	M	S
28'	212.7	85.1
30'	244.1	97.7
31.5'	269.2	107.7

W21x62
S = 127
OK

SPANDREL — w = 1.1 k/ft
L MAX = 30'   M = 123.4
S = 49.6

W21x44 — S_x = 81.6
W18x50 S = 88.9

4G-1C (@ MECH. SHAFT - UNDER BTC)



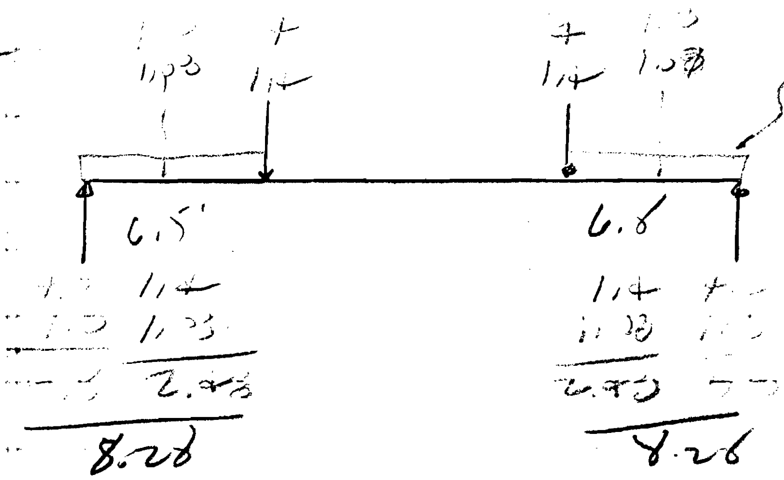
M = 43.5(14) 609
30.3 (7) - 212.1
396.9
S = 158.8

W21x62
[52]
@ 27.9 = 162

FIRST FLOOR

1SB-1 (NO CARRYING WALL!)

NC



(.10) .275
(.06) .168

$M = 8.28(6.5) = 53.7$
$-2.33(5.20)$ 9.4
44.3'k

$S = 17.72$
USE W16×31

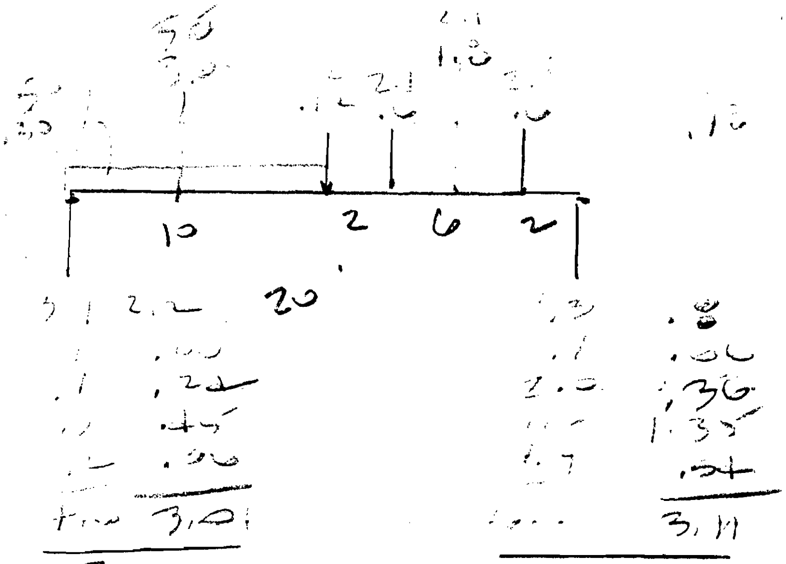
2nd FLOOR · FINAL DESIGN
@ BALCONY

2B1 - See pg. 1 From orig.

2B2 L = 30' w = 5 (.07) (1.00) = .30 / .654

m = 73.1
S_{30} = 29.28
R =

2B-3 (NC)



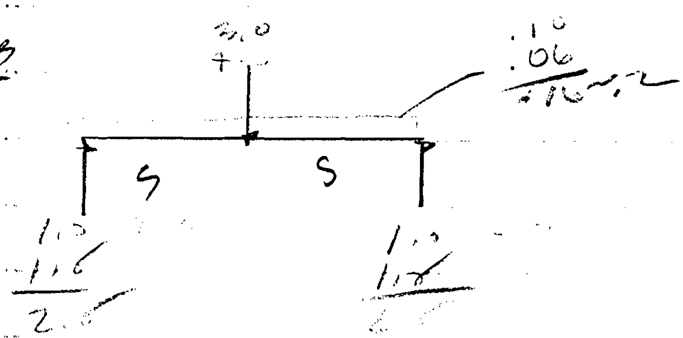
7.61

10.01

M = 7.61 (9.52) 72.45
− .8 (9.52² / 2) = 36.26
36.2

S_{30} 14.8
W14×22

2B-3B (NC)



5.8

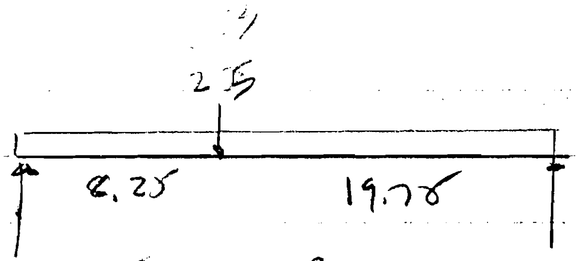
5.8

M 5.8 (5') = 29.0
−.2 (5² / 2) −2.5
26.5

S = 10.6

CD 2.1.1

2B-4
1/2 L



28

4 ; 5.5
13
7.3
18.0

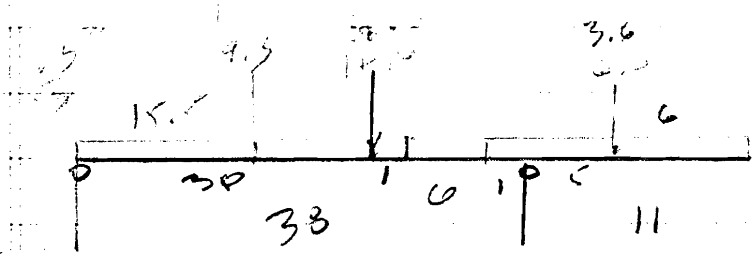
5.5
.7
6
16

1.04 + 1.08

$M = 16(15.4) = 246.4$
$-1.04\left(\frac{15.4^2}{2}\right)$ 123.3
123.1

$S_3 = 49.24\ in^3$
W16x31 (28)

2B-5



$M_c = .8\frac{(11)^2}{2} = 48.4$

-.5
3.0
5.5
8.0
11
19.8
1.3
20.3

4.1
11.5 11.3
3.3
19
43.3

$M_B = 20.3(26) = 540.8$
$= .8\frac{(26^2)}{2}$ 270.4
270.4

$S_{36} = 103$

$\Delta_{CAN} = \frac{.8(11)^3 1728}{24\ EI}\left(4(38) + 3(11)\right) = 439.07$

$\frac{439.1}{.38} = 1398$
1956.4
.28

W21x68 S=140, I=1480

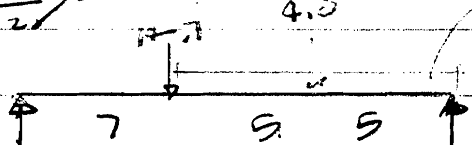
Optus Back span - $\frac{28.9(260)(26)}{27\ E\ I\ 38}\sqrt{4100\ 1728} = \frac{1192}{I}$

UNF. $\frac{1294}{I}$

$\frac{2436}{I}$ $\frac{2436}{1.2} = 1988.3$

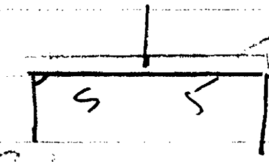
W21x93
S=192
I=2070

2B-5A



2.6 11.7
2.0
13.6
23.9

6.1
4.3
13.4 11.9
22.3



6.1
6.1

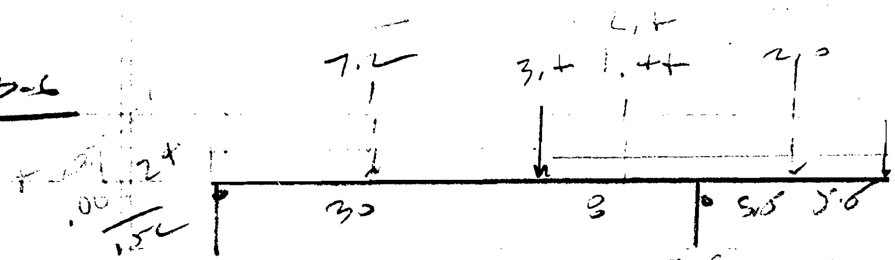
$M = 23.9(7) = 167.3$
$S = 66.92$

$M = 6.1(5) = 30.8$
$-.2\frac{(5^2)}{2}$ 2.6
28
S=11.2

6A

CD2-1.2

2B-6



3 .06 .10

4.3
.7
.2
-.3
4.4
(5.6)

2.9
2.7
1.24
2.3
9.14
20.44

$Mc = 5.3(5.5) = 29.2$

$(11.2)\ 21.54) = 241.2$

$-\ .52(\frac{21.54^2}{2})\quad 120.6$

$120.6 \qquad S_{30} - 48.3$

$\Delta\ CANT. = \frac{.48\ (11)^3\ 1728}{24\ EI}\ (135) = \frac{294}{I}\quad \frac{294}{.38} = 940$

CB.

$MW.\ \frac{6.8\ (240)\ (46)\ \sqrt{4140}\ 1728}{1560 \qquad 275\ I\ 38} = \frac{268.2}{I}$

UNIT

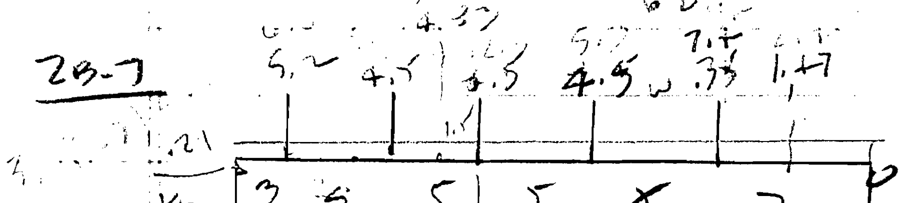
$\frac{809}{I}$

1077.2
1.25
861.8

W13×55 $S_x = 98.3$ $I_x = 890$

W21×50 $S_x = 94.6$ $I_x = 984$

2B-7



3.5(.1)
.06 .21
.156

30

4.83
1.3
2.98
4.22
1.8
1.81
.17
17.56
41.9

.52
1.23
1.85
3.62
2.7
5.94
1.3
17.19
39.2

$M - 41.9(13)$ 544.7

11.2(10) 112

9.8(5) 49

$.46\ (\frac{5^2}{2})$ 5.75

377.98

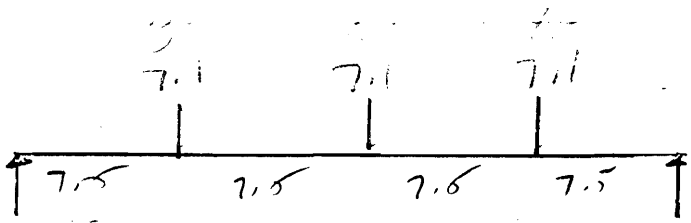
~378

$S_{30} = 151.2$

2B-7 (cont.)

UNIF (2.7 k/ft) $\frac{1697}{1}$ = 1697 W21x57 [33]

2B.3A/3B



4.65 / 10.68 / 15.3   17.7 / 33

4.67 / 10.68   17.7 / 33

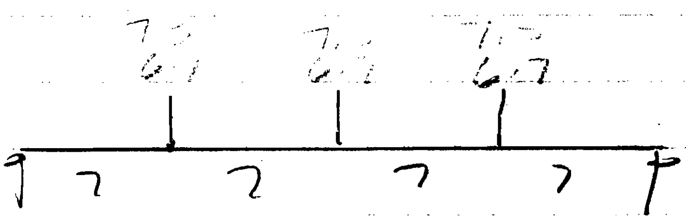
M = 33(15) = 495
− .84(15²/2) 94.8
− 15.4(7.5) 115.5
~~344.6~~
305.2

S 30 = 122.1

W21x50 S_x = 126 @ 39.8
I = 1966

62.2 k²

1/2 c $\frac{1382.8}{1}$ = 1383



4.3 / 10.08 / 14.39 11.7

~~21.5~~ 31

4.3 / 10.08 / 14.39 11.7

M = 31(14) 434
14.5 (7) 101.6
.66 (14²/2) 64.7
267.8

W21x44 S_x = 126 e 1/2 S = 107.1

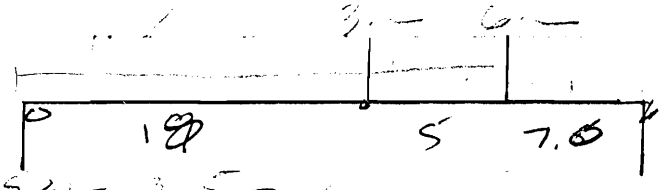
2B-6 L = 10' w = 5 M = 10

use W12x19 [10] .8 R = 2.6 / 1.5

2B-6A − DMW = S/I I = 15.2 use W12x17

CD2-1.4

2B-9



3.78
1.42
5.17

.78

$M = 19.35(18) = 348.3$

$-.73\left(\frac{18^2}{2}\right)\ 126.4$

221.9

$S_{30} = 88.76$

$\frac{\text{Ω} = W12}{1} = 10.2$ W 16 x 40 [30]

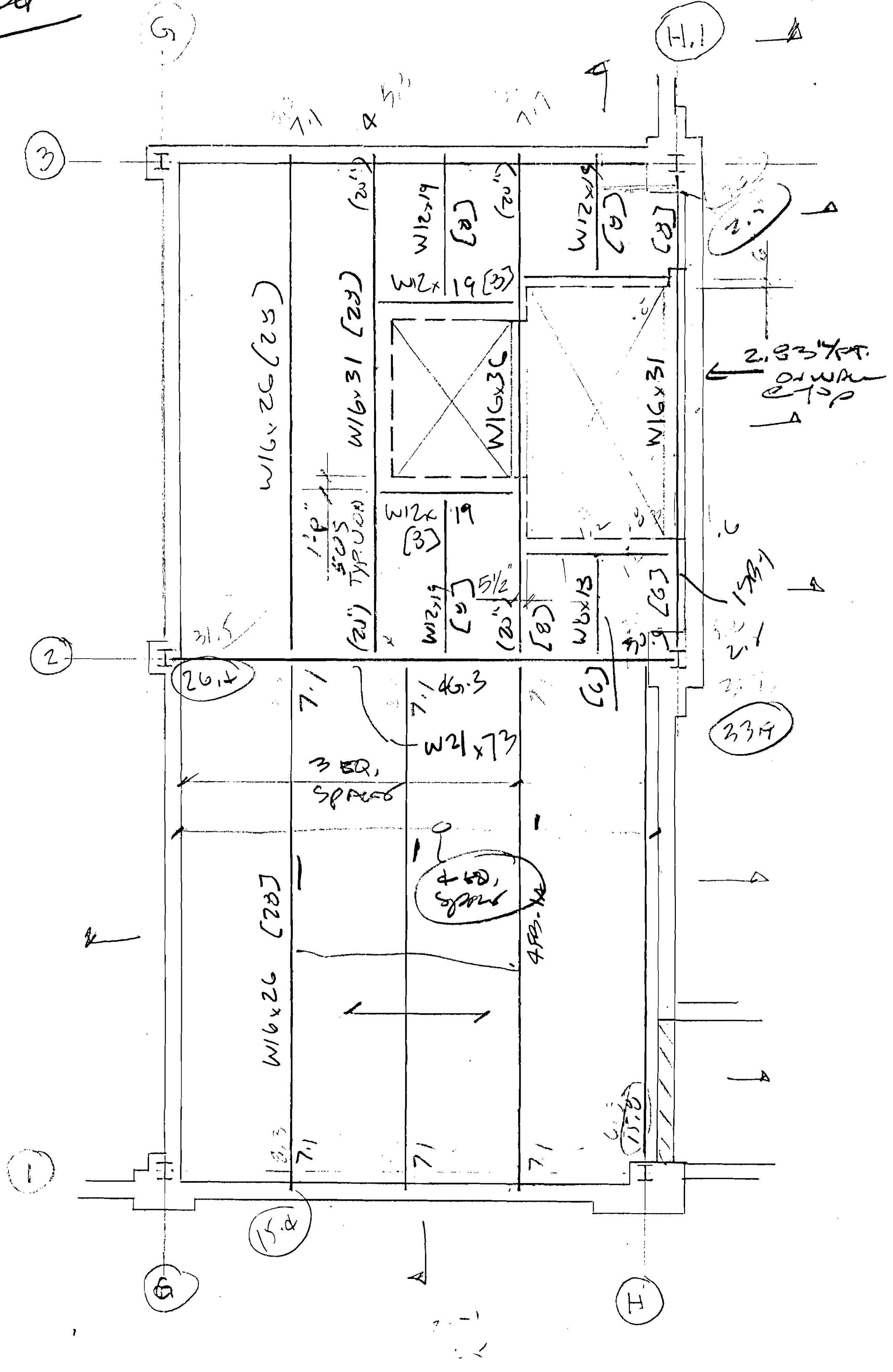
2B-10 L = 31.5 w = .41 M = 99.3 S = 40

.73

6.5

$\frac{\text{Ω} 11.1}{1} = \text{Ω} 11.1$ Ω W14x36 [34]

1st Floor



G
H.1
3
2
1
H
W16x26 [25]
W16x31 [23]
W12x19 [8]
W12x19 [3]
W16x36
W16x31
W12x19 [3]
W12x19
W8x18
26.4
W21x73
3 EQ. SPACES
4 EQ. SPACES
W16x26 [23]
15.4
33.4
2.83 k/ft. ON WALL TOP

2ND Floor

ELEVATION LOADING (CONSTRUCTION)

SD-1.0

DEAD LOADS - ROOF

- BRUSHED SINGLE PLY ROOF	17.0 psf
- RIGID INSULATION	5.0
- PARKED METAL DECK	3.0
- FRAMING	5.0
- CEILING / SOUND SYSTEM	5.0
- MISC. M/E	5.0
DL →	40.0 psf
LIVE / SNOW	35.0
(6" WATER 31.2 PSF)	75.0 TL

LINE LOADS - SCHOOL WALL

→ 5 1/2" L.W. CONC. ON 2", 20GA COMP. DECK

DEAD LOADS - FLOOR — OC 7'-4" ISPAN, 9'-6" 2SPAN

(5") 4" N.W. CONC. W/ 1 1/2", 20 GA. COMPOSITE FLOOR DECK	(2")	(44)	50.0	39.0 psf
FRAMING				6.0
CEILING				5.0
MISC. / M/E				5.0
			(60.0) OK	55.0
CONST. DL = 50 LB/SF	LIVE LOAD			50.0
" LL = 20	PARTITIONS			20.0
	(130)		+60	125.0 TL
	PARTITIONS			100.0
	(160)		+60	155.0 TL

"BALCONY" – ELEVATOR LOBBY – 2nd FLOOR

LOAD FOR CONST. 50 DL
20 LL
70 PSF

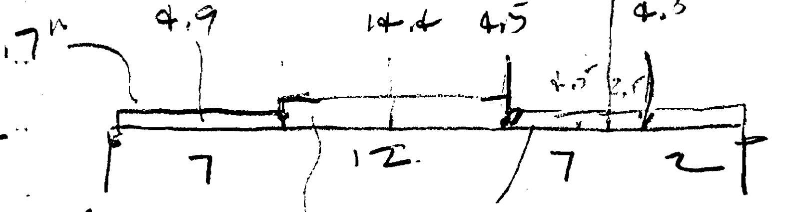
CANTILEVER SCHEME

2B-1 L = 30'-0" w = 4(.16) = .64 .39
4(.13) = .52 .10 w
1.16 ~ 1.2 k/ft .49 k/ft
R = 7.4 k 1.04 k/ft

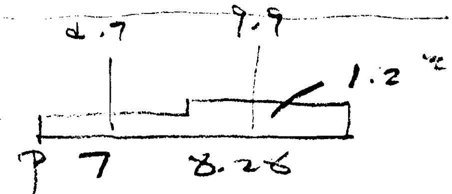
M = 135
S_{30} = 54
R = 18 k

M_{CONST} = 63
S_{30} = 25.2
W16×26 [0]

(STAIR 6.3)

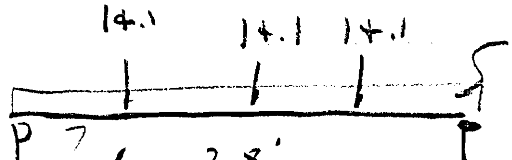
2B-2


4.3 | 1.2 k | .7 | .6
7.7 | 1.28 ~ 1.3 | | 6.7
1.5 | (PUBLIC SPACE) | | 3.0
1.0 | | | 5.3
.3 | | | 4.2
14.8 | | | 19.8

M =


14.8(15.28) = 225.7
4.9(3.5) = 17.2
9.9(11.128) = 110.1
98.4 k

S_{30} 39.4
NC

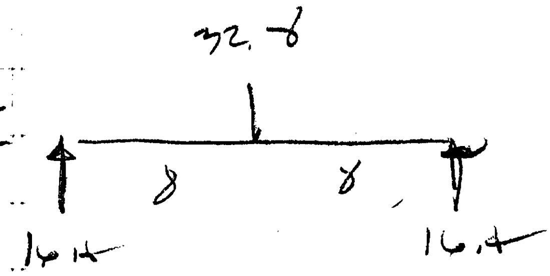
2B-3


3A
10.7 9.3 7.8 30" 9.8
22.05 21.15 21.15
30.95 31.98
33.15 331.5

M = 32.9'(14) = 433.3 ... 15
.7(14/2)^2 = 68.6 78.78
−14.1(7) = 98.7 113.28
15.1 7.5 266 k
497.23
308.28

S_{30} = 106.4 W21×44 1/2 comp [24]
122.1 W21×50 1/2 comp [28]

2B-4



M = 16.4(8) = 131.2

S = 52.5

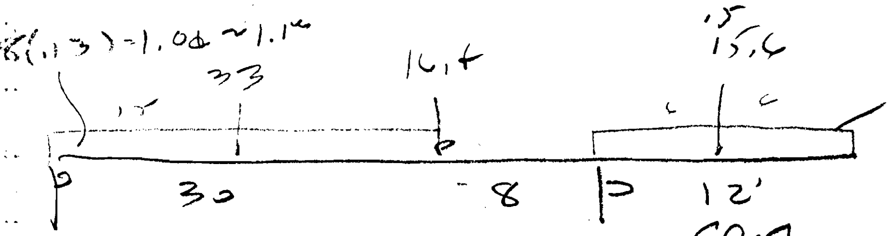
NC [12]

Δ = 16.8 / 15 = 33.6 / 10.7

W16×31

2B-5

8(.13) = 1.04 ~ 1.1



8(.16) = 1.28 ~ 1.3

-2.5
3.5
20.0
21.0

18.1
12.9
13.0
44.0

Mc = 15.6(6) = 93.6

MBS = 21.0 (19.1)   401.1
− 1.1 (19.1²/2)   200.6
200.5   S30 = 80.2

Δ CANT.

$(x_1 - a) \frac{1.3\ (12^{-3})\ 1728}{24\ E\ I} (4(38) + 3(12))$

(188)

1048.53 / I   1048.53 / .4 = 2621.3

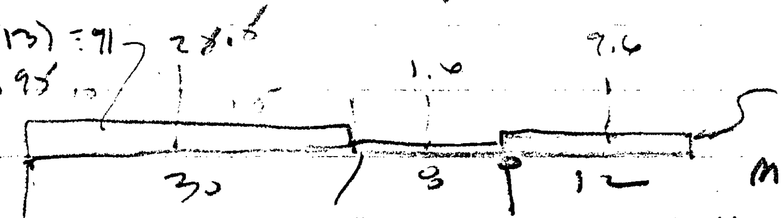
L/360 → .4

W21×111
I = 2670

21 1/2 × 12 3/8 PL.

2B-6

7(.13) = .91
2.95



5(.16) = .8

Mc = 9.6(6) = 57.6

MBS = 15.9(16.8) = 267.12
− .95(16.9²/2) = 135.66
131.46

.24

17.2
.2
−1.8
15.9

11.3
1.4
11.1
23.8

S30 = 52.6

2B-6 (con)
Δ ans.

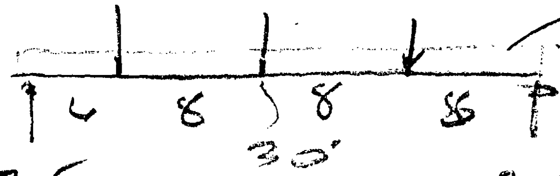
$\frac{.8 \quad 12^3 \quad 1723}{24 \quad 8 \quad 7}$ (4 138) + 3(.2)

(188)

$\frac{645.3}{I} = \frac{645.3}{.4} = \underline{1613}$

W21×73 S = 151 I = 1600
21¼ × 8¼"

2B-7 17.4 23.5 18 — 3.5(.13) = .46 ~ .54



7.5	7.8
13.9	3.5
12.5	11.0
4.8	13.2
38.7	35.2

M: 38.7 (14) = 541.8
− .5 ($\frac{14^2}{2}$) 49.0
− 17.4 (8) 139.2
353.6"

S = 141.44

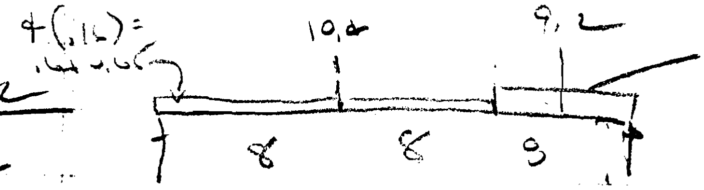
½ comp
W21×57 [30]
Sb-153

BALLON'S - ELEVATOR LOBBY - 2ND FLOOR
ORIGINAL SCHEME: USING POST OR HANGER

B-1 L = 24' w = 6(.16) = .96 ~ 1.0 k/' M = 72
C S = 28.8

W14x22 [24] ✓ ✓

B-2
1/2



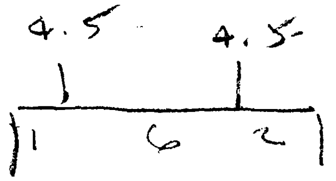
1.5
6.9
8.4

7.7
3.5
11.2

M = 8.4(12.95) = 108.6
−.65($\frac{12.95^2}{2}$) : 54.3
54.3

S = 21.72
W14x22 [24]

B-3
NC

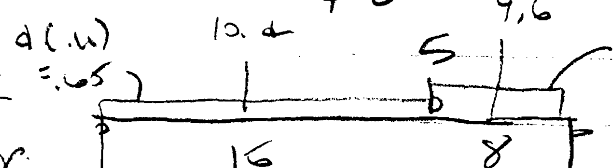


4.0
1.0
5.0

.5
3.5
4.0

M = 4 × 2 = 8'k
W14x22

B-4
1/2 comp.



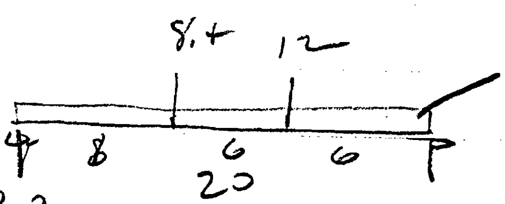
6.9
1.7
1.6
10.2

3.5
3.3
8.0
14.8

M = 10.2 (15.7) = 160.14
−.65 ($\frac{15.7^2}{2}$) : 80.1
80.04'k

S_{30} = 32
W12x22 (12)

B-5
NC

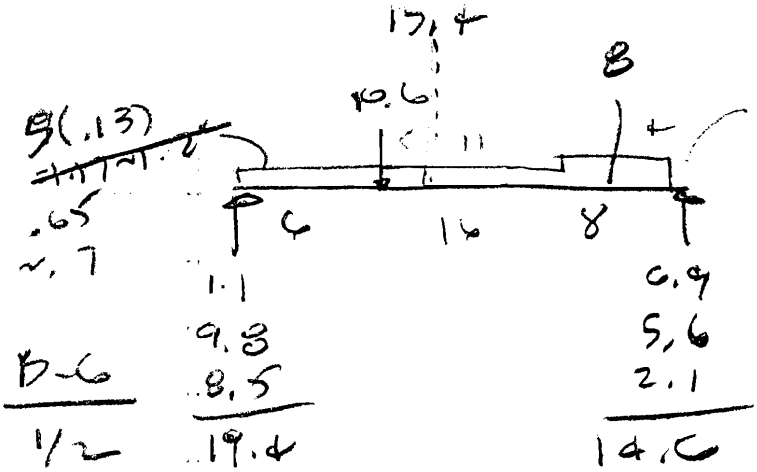


2.0
5.0
3.6
10.6

2.0
3.4
8.4
13.8

M = 10.6 (10) = 106
−.2 ($\frac{10^2}{2}$) − 10
− 8.4(3) 25.2
70.8

S = 28.32
W16x26 [12]

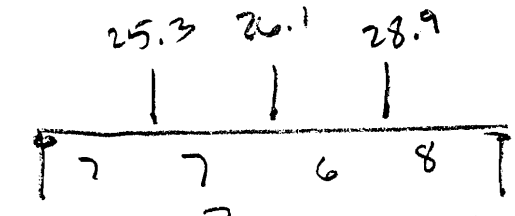


B-6
1/2

W16×31 [13]

$M = 19.4(12.6) = 244.44$
$-.7\left(\frac{12.6^2}{2}\right) = 55.56$
$-10.6(6.6) \quad 69.96$
118.92^{k-ft}

$S = 47.6$



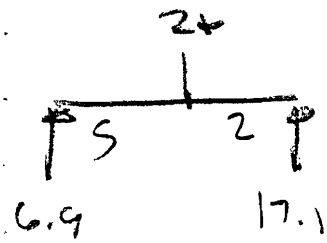
B-7
1/2

$M = 40.31(14) = 564.34$
$-25.3(7) = 177.1$
387.24

$S = 154.9$

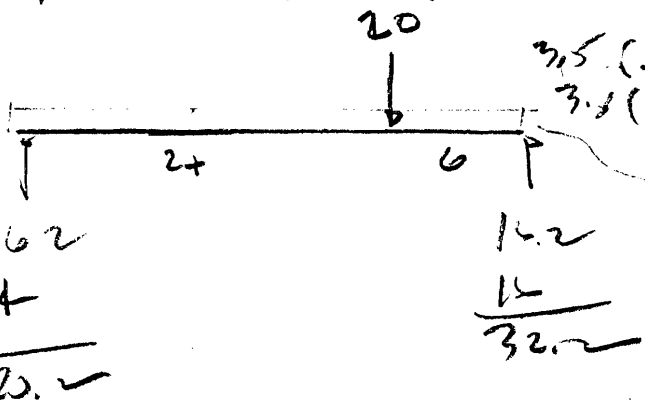
W21×62 [34]

FLOOR ABOVE - FOR HANGER



$M = 17.1(2) = 34.2$

U3520 (TO RCV. HANGER)



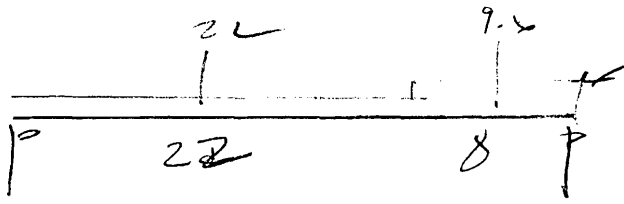
$M = 20.2(19.3) = 389.9$
$-1.05\left(\frac{19.3^2}{2}\right) \quad 195.6$
194.3

W16×36 [30]

$S_{30} = 97.72$

Typ Bay - continued

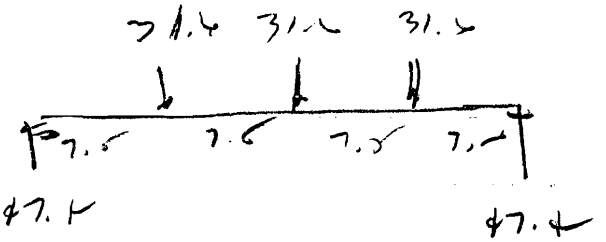
TB-1 Bm. L = 20' w = 7.5 (.13) = .975 ~1.0k



M = 15.2 (15.2) = 231.0k
- 1.0 (15.2²/2) 115.5k
115.5k

S = 15.2k

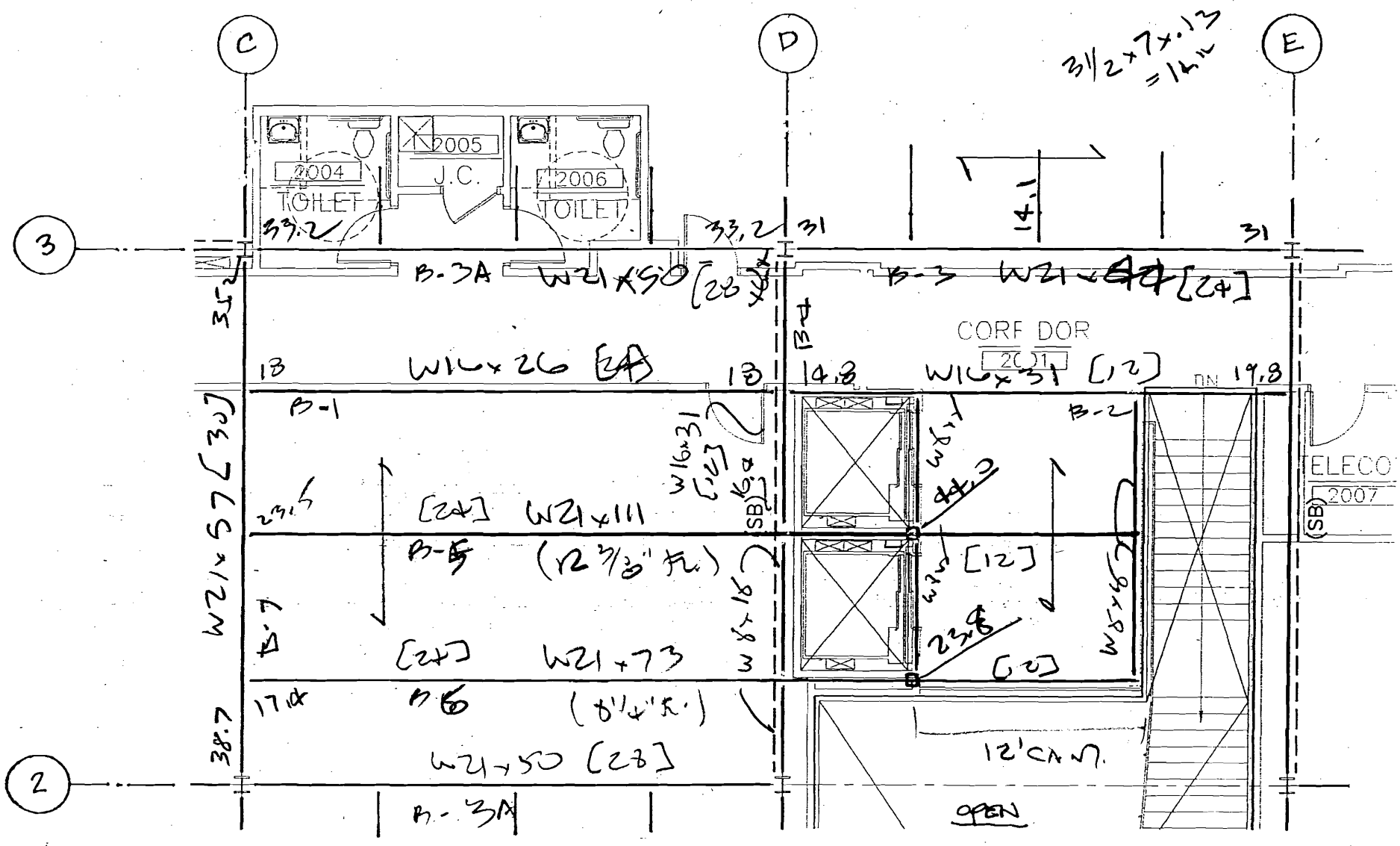
TG-1 -

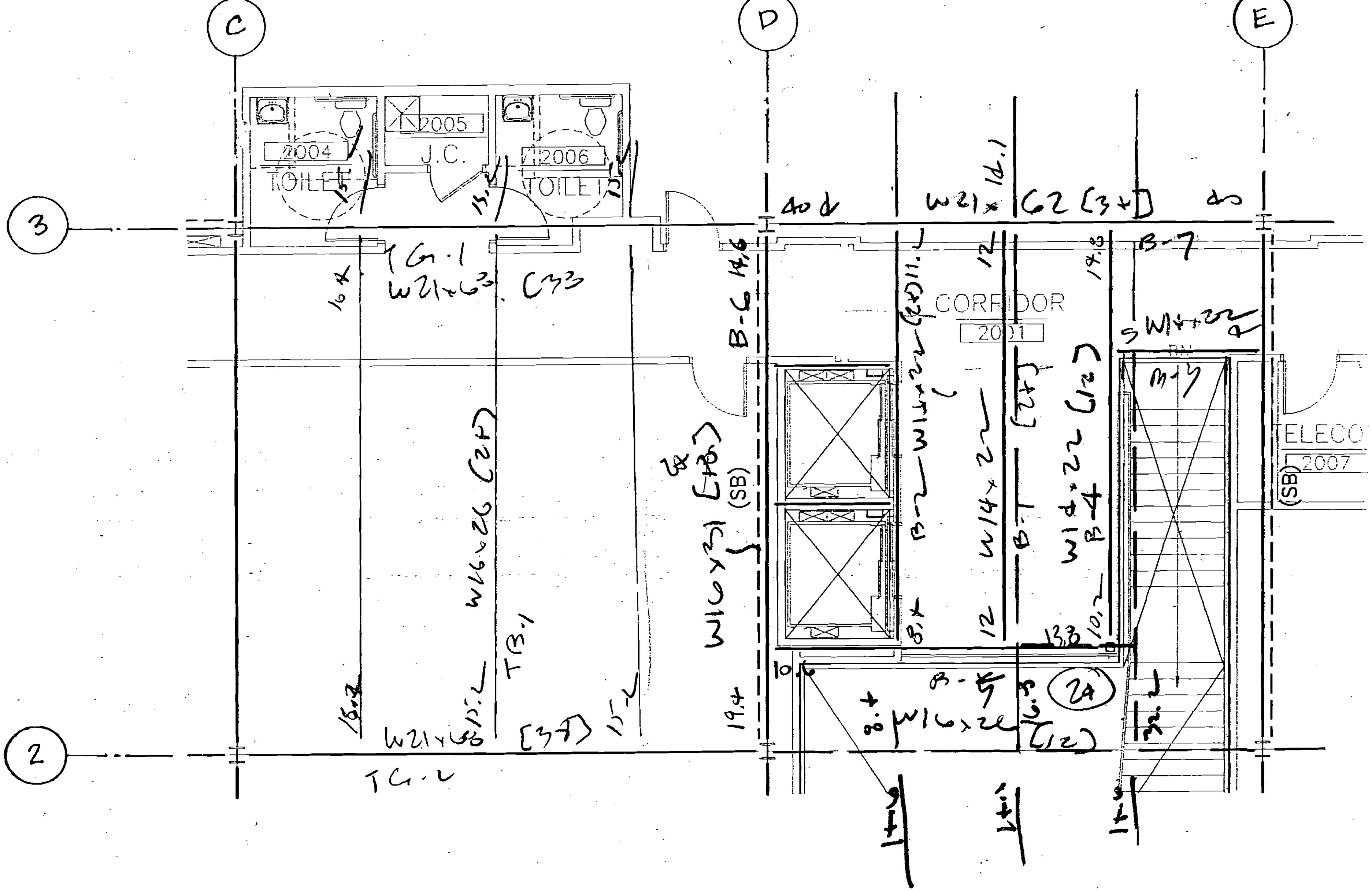


M = 47.4 (15) = 711
- 31.2 (7.5) 237
474

S = 189.6

TG-2 - Same as TG-1 W21 x 68 [38]


C
D
E
3
2
2004
TOILET
2005
J.C.
2006
TOILET
B-3A W21×50 [28]
B-3 W21×44 [24]
CORR DOR
2001
W16×26 [24]
W16×31 [12]
B-1
B-2
W21×57 [30]
[24] W21×111
(12 3/8" ϕ)
B-5
[24] W21×73
(8 1/4" ϕ)
B-6
W21×50 [28]
B-3A
W8×18
W8×24
[12]
[6]
OPEN
12'CLR.
ELECO
2007
(SB)
DN
31 1/2×7×.17
=14"

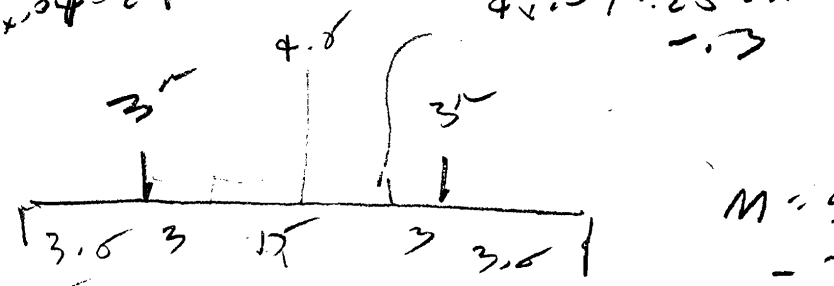


C
D
E
3
2
2004
TOILET
2005
J.C.
2006
TOILET
CORRIDOR
2001
(SB)
(SB)
2007

CANOPY BM.

CANOPY: 4 x 10.6 x .09 = 2.9 + .3 = 3"

ROOF



M = 5.25 (14) = 73.5

- 3 (10.5) 31.5

- .3 (7.5 / 2) 9.1

33.6

S = 16.8

CHECK Δ

$\frac{3(3.5)(12)}{24(E)I}(2352 - 49) = \frac{60}{I}$

(2303)

$\frac{2.25(6.5)(12)}{24 E I}(2352 - 169) \quad \frac{79.3}{I}$

$\frac{139.3}{I}$

$\frac{139.3}{17'} = 185.8$ MIN. I

W14 x 22 S = 29 I = 199 OK!

VESTIBULE

L = 15' w = 6.5 (.05) = .325
3 (.02) = .06
.385 w .4# M = 11.25"

5 x 7 x 1/4 Tube S = 14.9 I = ~~125~~ 38

CHECK O.

$\frac{15.1}{(1/200) \cdot 3} = 52.3$ NG. REDO

Try 6 x 3 x 1/4
I = 60.1 OK

Try 5 x 9 x 1/4 I = 70.3

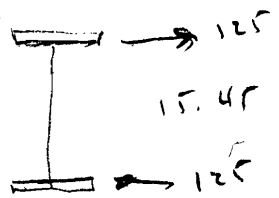
4 x 8 x 5/16 I = 53.9
S = 13.5

$\frac{1.26}{1.65} = \frac{1.5}{1.28} = \frac{x}{1.10} = 2.1$ use 2'

Canopy pl. $\frac{30+22}{2}$ 4.010 = 1.65

G.B	2.64×2.6 4.15+5	=	4.7
G.B	14+4.5+15 4.15	=	10.1
G.B.U	14 2.5+2+.15	=	.7
Slab	$\frac{16+3}{2}$ 4 12.5 +4	=	1.2
P.U	1.67 + π 6.0 4.15	=	3.93 4.7
P/O	.057 × 85	=	4.8
D.L.			27.1 ↓ 26.2

Up L. ft. 15+20 4.025 = 7.5 ↑



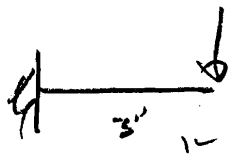
W16×50

M 16 2 11K

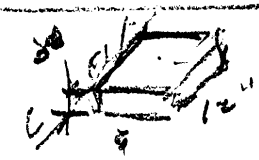
16.260
.415

$\frac{1}{10}$ .8 16 1/2

$\frac{S}{B}$ = 8K/ft 4 16" = 128



M_2 .4 × 3 = 1.2 11K

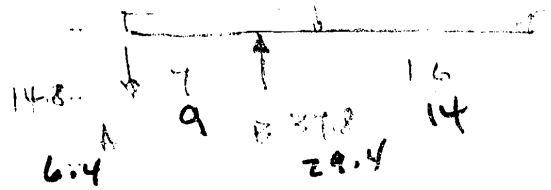


$S = \frac{1}{6}$ 12 .375²

$S = .281\ in^3$

$f_c = \frac{1.2\ 11K}{.281\ in^3} = 4.27 KSI$

Curve Line (1) (D) to (E)



$\frac{23 \times 11.5}{9} = 29.4$

$M = 1.14 \cdot 96$

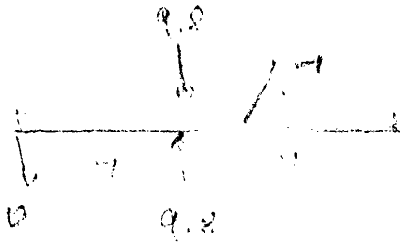
$S = 49$

24

$\Delta = \frac{286.1}{I}$

Δ	I				I			Sx	I
1"	480				286	W16x36		47.2	375
2"	240				143				
3/4"		W18x35	57.6	510	381.5	W16x36			
1/2"		W18x40	68.4	612	572	W16x45		72.7	586
3/8"	→	W18x50	88.9	800	762.9	W16x67		117	954
1/4"		W18x71	127	1170	1144.4	W16x77		134	1110
		W21x44	81.6	843		W24x55		114	1350
		W21x57	111	1170					

Canope Line 4 D_1 to E



W = [illegible] Say [illegible]

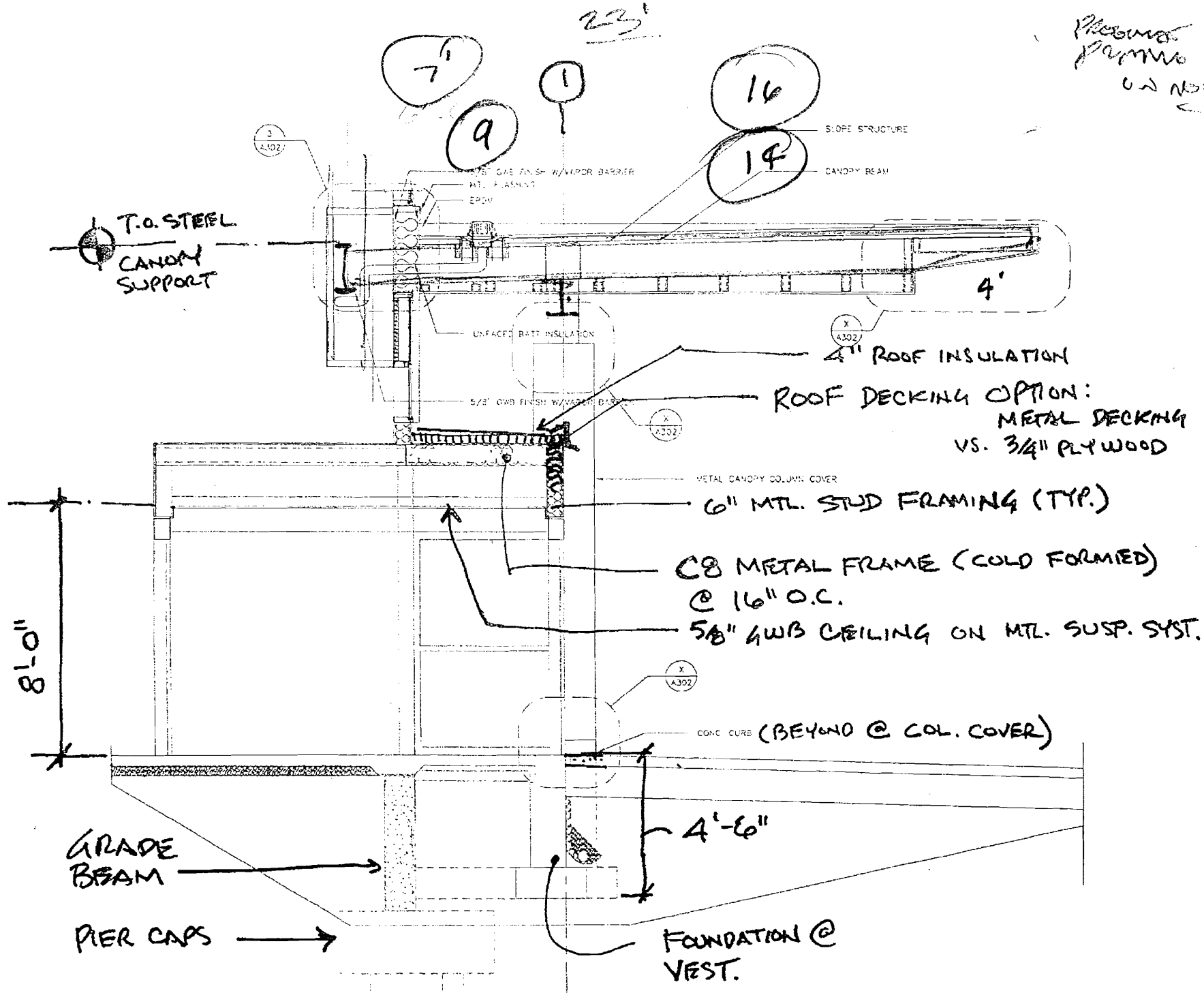
M = [illegible] = 17.2

$\Delta = \frac{wl^4}{8EI} = \frac{[illegible]}{8 \times 29 \times 10^6 \, I} = \frac{13.5}{I}$

$\Delta = \frac{l}{[illegible]}$ I = 33.36 W14 × [illegible]

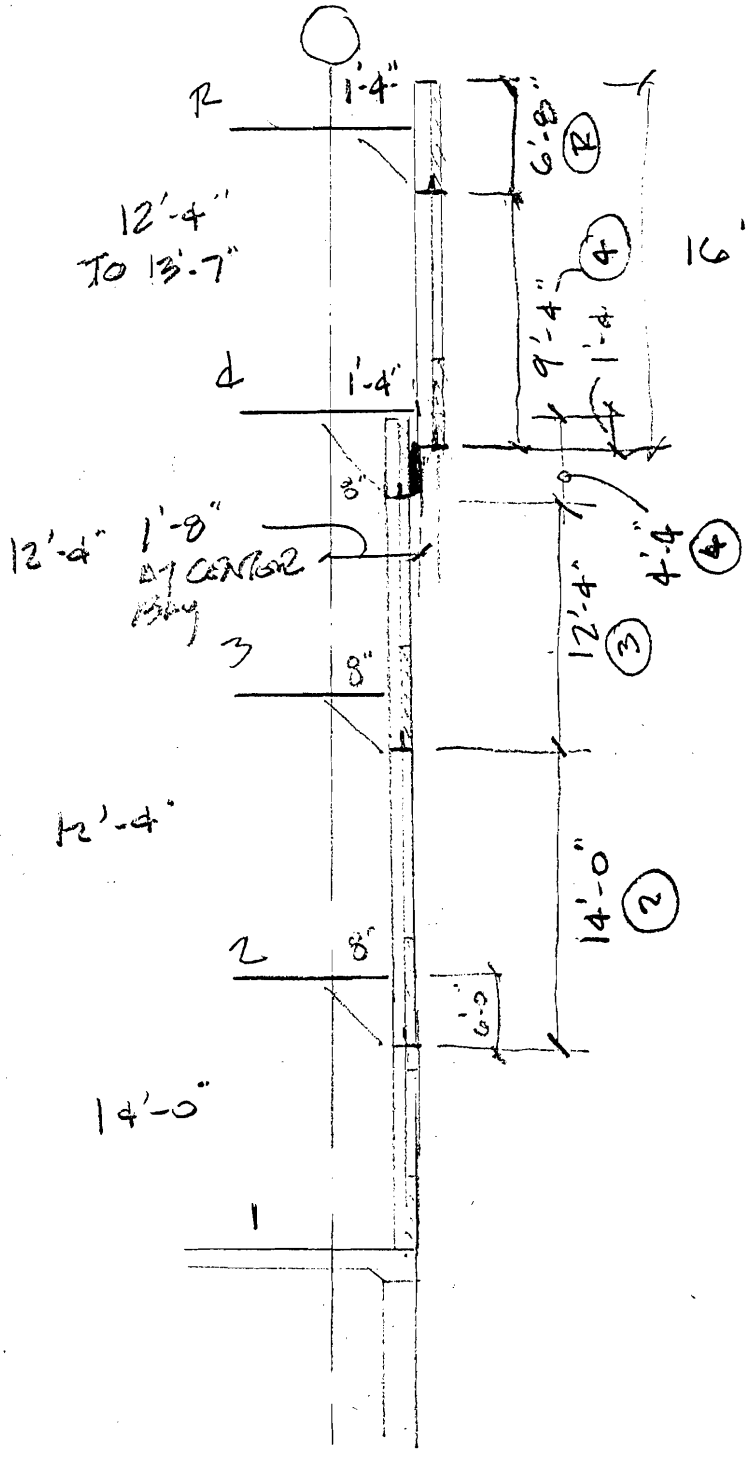
L = 21 W = 5 × .06 = .3

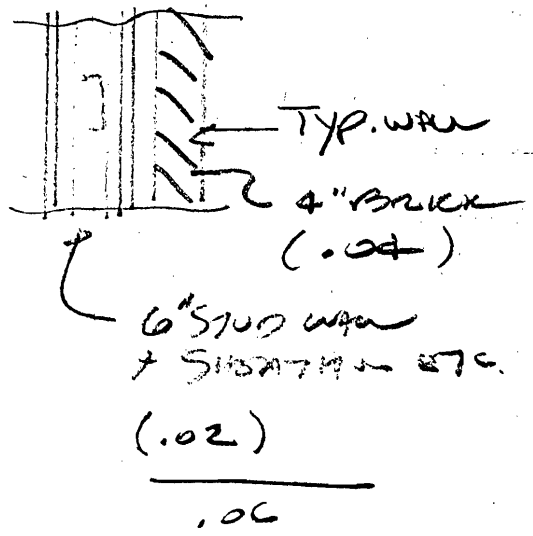
M = 16.5 W [illegible]



SECTION THRU CANOPY /VESTIBULE 1001A 10/24/06

ANALYSIS OF
EXTERIOR WALL SUPPORT





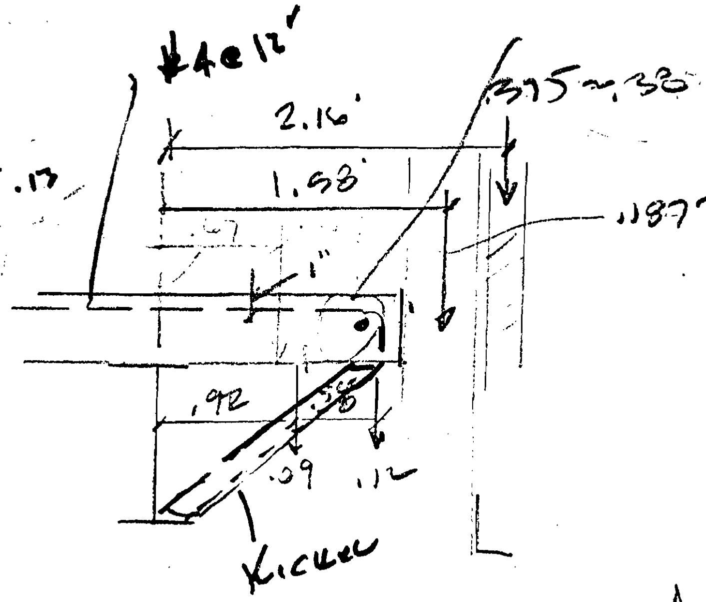
ROOF : 6.67 (.06) = .40 K/LF

4TH : 9.33 (.06) = .56
4.33 (.02) .09
3.0 (.04) .12
.81 K/LF

3RD : 12.33 (.06) = .74 K/LF

2ND : 14.0 (.06) = .84 K/LF

4TH



.17 (.67) .11 ~~.045~~

Mr = .38 (2.16) = .821

.19 (1.58) = .300

.12 (1.50) = .130

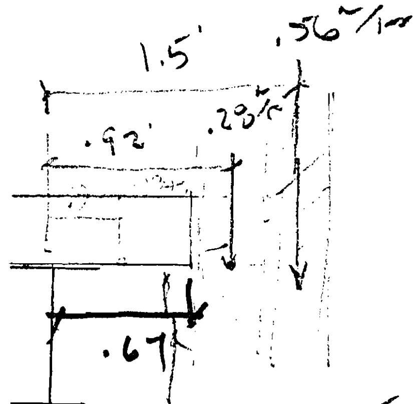
.09 (.92) = .083

1.429 k/FT. 1.4939

$$As/FT. = \frac{1.43}{1.76 (4.5)} = .181 in^2/FT.$$ (1.49; .19)

#4 AT 12, As = .20 in²

3RD/2ND
(USE 2ND MOST SIMILAR)



.087 (.33) .03

Mr = .56 (1.5) = .84

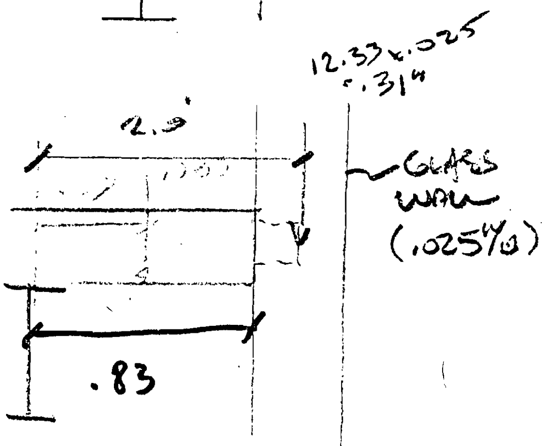
.28 (.92) = .26

1.13 k/FT

$$As = \frac{1.13}{1.76 (4.5)} = .14 in^2/FT.$$

#4 @ 16", As = .15 in²

3RD AT CENTER BAY



.100 (.83) .09

.31 (2.0) = .62

.691 k/FT. (.71)

$$As = \frac{.691}{1.76 (4.5)} = .088 in^2/FT$$ (.71)

*** 2 INCH DECK 5.5 INCH SLAB ***

W 14 X 48		70.2	485		140.4			
B	St	Sb	I9	I14	M	2Vh	Studs	
96	361	115	1685	1518	230 S	508 S	46	52
90	346	115	1662	1492	229 S	508 S	46	52
84	330	114	1636	1464	228 S	508 S	46	52
80	319	114	1618	1444	227 S	508 S	46	52
75	305	113	1594	1418	226 S	508 S	46	52
72	297	113	1578	1401	226 S	508 S	46	52
41	200	108	1351	1170	203 C	366 C	32	38
PARTIAL COMPOSITE								
77 %@ 96		110	1538	1397	219	392	34	40
54.4 %@ 96		103	1370	1221	207	276	24	26
27.2 %@ 96		94	1111	1025	187	138	12	14

*** 2 INCH DECK 5.5 INCH SLAB ***

W 14 X 43		62.7	429		125.4			
B	St	Sb	I9	I14	M	2Vh	Studs	
96	345	103	1524	1380	206 S	454 S	40	46
90	330	103	1504	1358	206 S	454 S	40	46
84	315	102	1482	1334	205 S	454 S	40	46
80	305	102	1467	1316	204 S	454 S	40	46
75	292	102	1446	1293	203 S	454 S	40	46
72	284	101	1432	1279	203 S	454 S	40	46
41	192	97	1235	1073	194 S	366 C	32	38
PARTIAL COMPOSITE								
76.1 %@ 96		98	1384	1248	196	346	30	34
50.7 %@ 96		92	1209	1117	183	230	20	24
25.4 %@ 96		83	980	916	166	116	10	12

*** 2 INCH DECK 5.5 INCH SLAB ***

W 14 X 38		54.7	386		109.4			
B	St	Sb	I9	I14	M	2Vh	Studs	
94.8	334	93	1427	1299	186 S	404 S	36	42
90	323	93	1413	1283	185 S	404 S	36	42
84	309	92	1394	1261	185 S	404 S	36	42
80	299	92	1380	1245	184 S	404 S	36	42
75	287	92	1361	1224	183 S	404 S	36	42
72	279	91	1349	1211	183 S	404 S	36	42
39.8	185	87	1161	1012	174 S	356 C	32	36
PARTIAL COMPOSITE								
79.9 %@ 94.8		89	1316	1195	178	322	28	32
51.3 %@ 94.8		82	1132	1057	164	208	18	22
28.5 %@ 94.8		75	942	838	150	116	10	10

*** 2 INCH DECK 5.5 INCH SLAB ***

W 14 X 34		48.6	340		97.2			
B	St	Sb	I9	I14	M	2Vh	Studs	
94.8	318	83	1287	1177	166 S	360 S	32	38
90	308	83	1275	1163	166 S	360 S	32	38
84	295	83	1258	1144	165 S	360 S	32	38
80	286	82	1246	1131	165 S	360 S	32	38
75	274	82	1230	1113	164 S	360 S	32	38
72	266	82	1220	1101	164 S	360 S	32	38
39.8	177	78	1057	926	156 S	354 C	32	36
PARTIAL COMPOSITE								
76.7 %@ 94.8		79	1169	1074	158	276	24	28
51.1 %@ 94.8		73	1017	961	147	184	16	20
25.6 %@ 94.8		66	819	779	132	92	8	10

*** 2 INCH DECK 5.5 INCH SLAB ***

W 14 X 30		41.9	290		83.8			
B	St	Sb	I9	I14	M	2Vh	Studs	
94.7	299	73	1140	1048	147 S	318 S	28	34
90	290	73	1130	1036	146 S	318 S	28	34
84	277	73	1116	1020	146 S	318 S	28	34
80	269	73	1106	1009	145 S	318 S	28	34
75	258	72	1093	994	144 S	318 S	28	34
72	252	72	1084	984	144 S	318 S	28	34
39.7	168	69	947	833	138 S	318 S	28	34
PARTIAL COMPOSITE								
79.6 %@ 94.7		70	1048	972	140	254	22	26
50.6 %@ 94.7		64	895	858	129	162	14	18
28.9 %@ 94.7		59	747	668	118	92	8	8

*** 2 INCH DECK 5.5 INCH SLAB ***

W 14 X 26		35.1	244		70.2			
B	St	Sb	I9	I14	M	2Vh	Studs	
93	277	64	1005	927	127 S	276 S	24	28
90	272	64	999	921	127 S	276 S	24	28
84	261	63	988	908	127 S	276 S	24	28
80	253	63	980	899	126 S	276 S	24	28
75	244	63	968	886	126 S	276 S	24	28
72	237	63	961	878	125 S	276 S	24	28
38	155	60	837	739	120 S	276 S	24	28
PARTIAL COMPOSITE								
75 %@ 93		60	903	851	120	208	18	22
50 %@ 93		55	782	728	111	138	12	14
25 %@ 93		49	624	610	99	70	6	8

*** 2 INCH DECK 5.5 INCH SLAB ***

W 14 X 22		28.9	198		57.8			
B	St	Sb	I9	I14	M	2Vh	Studs	
93	234	55	859	794	110 S	234 S	22	24
90	229	55	854	789	110 S	234 S	22	24
84	240	54	841	778	107 S	234 S	22	24
80	233	53	834	770	107 S	234 S	22	24
75	224	53	825	760	106 S	234 S	22	24
72	219	53	820	753	106 S	234 S	22	24
38	145	51	721	642	101 S	234 S	22	24
PARTIAL COMPOSITE								
78.8 %@ 93		52	785	719	105	184	16	18
59.1 %@ 93		49	706	623	98	138	12	12
29.5 %@ 93		43	557	499	86	70	6	6

*** 2 INCH DECK 5.5 INCH SLAB ***

W 12 X 50		64.7	395		129.4			
B	St	Sb	I9	I14	M	2Vh	Studs	
96.1	321	111	1456	1303	221 S	530 S	46	54
90	308	110	1434	1280	220 S	530 S	46	54
84	294	110	1411	1255	219 S	530 S	46	54
80	284	109	1394	1237	218 S	530 S	46	54
75	272	109	1372	1213	217 S	530 S	46	54
72	264	108	1358	1198	216 S	530 S	46	54
41.1	178	103	1153	991	181 C	366 C	32	38
PARTIAL COMPOSITE								
73.9 %@ 96.1		104	1307	1180	208	392	34	40
52.2 %@ 96.1		98	1161	1052	196	276	24	28
26.1 %@ 96.1		88	937	860	176	138	12	14

*** 2 INCH DECK 5.5 INCH SLAB ***

W 16 X 40		64.6	517		129.2			
B	St	Sb	I9	I14	M	2Vh	Studs	
95	389	106	1789	1630	212 S	424 S	38	44
90	376	105	1771	1609	211 S	424 S	38	44
84	359	105	1747	1581	210 S	424 S	38	44
80	347	105	1730	1562	209 S	424 S	38	44
75	332	104	1707	1536	209 S	424 S	38	44
72	323	104	1692	1519	208 S	424 S	38	44
40	214	99	1459	1275	199 S	358 C	32	38
PARTIAL COMPOSITE								
75.8 %@ 95		101	1624	1508	201	322	28	34
54.1 %@ 95		95	1453	1314	190	230	20	22
27.1 %@ 95		86	1179	1106	172	116	10	12

*** 2 INCH DECK 5.5 INCH SLAB ***

W 16 X 36		56.5	447		113			
B	St	Sb	I9	I14	M	2Vh	Studs	
95	369	95	1607	1470	189 S	382 S	34	40
90	357	94	1592	1452	189 S	382 S	34	40
84	341	94	1571	1429	188 S	382 S	34	40
80	330	94	1556	1412	187 S	382 S	34	40
75	316	93	1536	1389	186 S	382 S	34	40
72	307	93	1524	1375	186 S	382 S	34	40
40	204	89	1322	1159	179 S	356 C	32	38
PARTIAL COMPOSITE								
78.4 %@ 95		90	1474	1350	180	300	26	30
54.2 %@ 95		85	1301	1184	169	208	18	20
30.1 %@ 95		77	1084	1018	155	116	10	12

*** 2 INCH DECK 5.5 INCH SLAB ***

W 16 X 31		47.2	374		94.4			
B	St	Sb	I9	I14	M	2Vh	Studs	
93.5	343	81	1405	1292	163 S	328 S	30	34
90	335	81	1396	1281	163 S	328 S	30	34
84	321	81	1379	1262	162 S	328 S	30	34
80	311	81	1367	1248	161 S	328 S	30	34
75	298	80	1351	1229	161 S	328 S	30	34
72	290	80	1340	1217	160 S	328 S	30	34
38.5	188	77	1162	1022	153 S	328 S	30	34
PARTIAL COMPOSITE								
77 %@ 93.5		77	1279	1186	155	254	22	26
56 %@ 93.5		73	1145	1050	146	194	16	18
28 %@ 93.5		65	919	825	131	92	8	8

*** 2 INCH DECK 5.5 INCH SLAB ***

W 16 X 26		38.3	300		76.6			
B	St	Sb	I9	I14	M	2Vh	Studs	
93.5	315	68	1186	1098	136 S	276 S	24	28
90	308	68	1179	1089	136 S	276 S	24	28
84	295	68	1166	1074	136 S	276 S	24	28
80	286	68	1156	1063	135 S	276 S	24	28
75	275	67	1143	1048	135 S	276 S	24	28
72	268	67	1135	1039	134 S	276 S	24	28
38.5	175	64	995	882	129 S	276 S	24	28
PARTIAL COMPOSITE								
75 %@ 93.5		64	1067	1009	128	208	18	22
50 %@ 93.5		59	926	865	119	138	12	14
25 %@ 93.5		53	743	727	107	70	6	8

*** 2 INCH DECK 5.5 INCH SLAB ***

W 14 X 74		112	797		224			
B	St	Sb	I9	I14	M	2Vh	Studs	
98.1	433	176	2467	2179	353 S	784 S	70	80
96	427	176	2454	2165	352 S	784 S	70	80
90	408	175	2413	2122	350 S	784 S	70	80
84	389	174	2368	2076	348 S	750 C	66	76
80	376	173	2336	2044	347 S	714 C	64	74
75	359	172	2294	2002	345 S	670 C	60	68
72	349	172	2267	1975	344 S	642 C	56	66
43.1	245	163	1928	1656	248 C	384 C	34	40
PARTIAL COMPOSITE								
76.2 %@ 98.1		168	2255	1999	336	598	52	60
52.8 %@ 98.1		159	2010	1779	317	414	36	40
26.4 %@ 98.1		145	1655	1491	290	208	18	20

*** 2 INCH DECK 5.5 INCH SLAB ***

W 14 X 68		103	724		206			
B	St	Sb	I9	I14	M	2Vh	Studs	
98	419	162	2287	2029	324 S	720 S	64	74
90	395	161	2239	1977	322 S	720 S	64	74
84	376	160	2199	1936	321 S	720 S	64	74
80	364	160	2170	1907	319 S	714 C	64	74
75	348	159	2133	1868	318 S	670 C	60	68
72	338	158	2108	1843	317 S	642 C	56	66
43	236	151	1800	1548	239 C	384 C	34	40
PARTIAL COMPOSITE								
76.7 %@ 98		155	2093	1869	310	552	48	56
51.1 %@ 98		145	1841	1667	291	368	32	38
25.6 %@ 98		133	1514	1373	266	184	16	18

*** 2 INCH DECK 5.5 INCH SLAB ***

W 14 X 61		92.2	641		184.4			
B	St	Sb	I9	I14	M	2Vh	Studs	
98	401	146	2076	1851	292 S	644 S	58	66
90	379	145	2034	1806	290 S	644 S	58	66
84	361	144	2000	1770	289 S	644 S	58	66
80	349	144	1975	1744	287 S	644 S	58	66
75	334	143	1942	1710	286 S	644 S	58	66
72	324	142	1921	1688	285 S	642 C	56	66
43	226	136	1649	1422	229 C	384 C	34	40
PARTIAL COMPOSITE								
78.5 %@ 98		140	1913	1701	279	506	44	50
53.5 %@ 98		131	1691	1516	263	346	30	34
25 %@ 98		119	1358	1241	238	162	14	16

*** 2 INCH DECK 5.5 INCH SLAB ***

W 14 X 53		77.8	542		155.6			
B	St	Sb	I9	I14	M	2Vh	Studs	
96.1	376	127	1845	1653	254 S	562 S	50	58
90	360	126	1818	1624	253 S	562 S	50	58
84	343	126	1789	1592	251 S	562 S	50	58
80	332	125	1768	1570	251 S	562 S	50	58
75	317	125	1740	1540	249 S	562 S	50	58
72	308	124	1722	1521	249 S	562 S	50	58
41.1	208	118	1465	1264	210 C	366 C	32	38
PARTIAL COMPOSITE								
77.8 %@ 96.1		121	1691	1520	242	438	38	44
53.2 %@ 96.1		114	1493	1350	227	300	26	30
28.7 %@ 96.1		104	1240	1132	208	162	14	16

*** 2 INCH DECK 5.5 INCH SLAB ***

W 16 X 96		166	1360		332			
B	St	Sb	I9	I14	M	ZVh	Studs	
99.5	549	247	3714	3260	494 S	888 C	78	90
96	535	246	3677	3224	492 S	856 C	76	88
90	511	245	3611	3158	489 S	804 C	70	82
84	487	243	3540	3089	487 S	750 C	66	76
80	471	242	3490	3040	477 C	714 C	64	74
75	450	241	3424	2977	456 C	670 C	60	68
72	438	240	3382	2937	443 C	642 C	56	66
44.5	318	226	2900	2504	322 C	398 C	36	42
PARTIAL COMPOSITE								
75.1 %@ 99.5		236	3400	3014	472	668	58	68
51.8 %@ 99.5		224	3054	2720	448	460	40	46
25.9 %@ 99.5		207	2558	2301	414	230	20	22

*** 2 INCH DECK 5.5 INCH SLAB ***

W 16 X 88		151	1220		302			
B	St	Sb	I9	I14	M	ZVh	Studs	
99.5	528	226	3431	3021	452 S	888 C	78	90
96	515	226	3398	2988	451 S	856 C	76	88
90	492	224	3339	2928	449 S	804 C	70	82
84	469	222	3275	2864	446 S	750 C	66	76
80	453	222	3230	2820	444 S	714 C	64	74
75	433	221	3170	2761	439 C	670 C	60	68
72	421	220	3132	2725	426 C	642 C	56	66
44.5	304	210	2690	2321	308 C	398 C	36	42
PARTIAL COMPOSITE								
75.1 %@ 99.5		216	3136	2788	432	668	58	68
51.8 %@ 99.5		205	2811	2510	410	460	40	46
25.9 %@ 99.5		189	2345	2112	379	230	20	22

*** 2 INCH DECK 5.5 INCH SLAB ***

W 16 X 78		128	1050		256			
B	St	Sb	I9	I14	M	ZVh	Studs	
96.6	496	208	3112	2746	400 S	828 S	72	84
90	472	199	3054	2686	398 S	804 C	70	82
84	449	198	2998	2629	396 S	750 C	66	76
80	434	197	2958	2588	394 S	714 C	64	74
75	415	196	2904	2534	392 S	670 C	60	68
72	403	195	2870	2501	390 S	642 C	56	66
41.6	276	182	2413	2076	279 C	372 C	34	38
PARTIAL COMPOSITE								
75 %@ 96.6		190	2836	2534	381	622	54	64
50 %@ 96.6		179	2508	2252	358	414	36	42
25 %@ 96.6		164	2081	1920	328	208	18	22

*** 2 INCH DECK 5.5 INCH SLAB ***

W 16 X 71		116	941		232			
B	St	Sb	I9	I14	M	ZVh	Studs	
96.5	478	182	2858	2533	365 S	752 S	66	76
90	455	181	2808	2480	363 S	752 S	66	76
84	433	180	2759	2428	361 S	750 C	66	76
80	419	180	2722	2392	359 S	714 C	64	74
75	400	179	2675	2343	357 S	670 C	60	68
72	389	178	2644	2313	356 S	642 C	56	66
41.5	265	169	2239	1923	268 C	370 C	34	38
PARTIAL COMPOSITE								
76.4 %@ 96.5		174	2617	2332	348	576	50	58
52 %@ 96.5		164	2323	2067	328	392	34	38
27.5 %@ 96.5		151	1947	1798	302	208	18	22

*** 2 INCH DECK 5.5 INCH SLAB ***

W 16 X 64		104	836		208			
B	St	Sb	I9	I14	M	ZVh	Studs	
96.5	459	164	2604	2319	329 S	676 S	60	70
90	437	164	2560	2273	327 S	676 S	60	70
84	417	163	2517	2227	326 S	676 S	60	70
80	402	162	2486	2194	324 S	676 S	60	70
75	385	161	2444	2151	323 S	670 C	60	68
72	374	161	2417	2124	322 S	642 C	56	66
41.5	254	153	2051	1770	257 C	370 C	34	38
PARTIAL COMPOSITE								
78.2 %@ 96.5		157	2399	2129	315	530	46	52
51 %@ 96.5		147	2098	1912	294	346	30	36
27.2 %@ 96.5		136	1758	1597	271	184	16	18

*** 2 INCH DECK 5.5 INCH SLAB ***

W 16 X 58		94.3	748		188.8			
B	St	Sb	I9	I14	M	ZVh	Studs	
96.5	442	150	2389	2138	299 S	616 S	54	64
90	421	149	2351	2096	298 S	616 S	54	64
84	401	148	2313	2055	297 S	616 S	54	64
80	388	148	2285	2026	295 S	616 S	54	64
75	371	147	2248	1987	294 S	616 S	54	64
72	360	147	2225	1963	293 S	616 S	54	64
41.5	244	139	1897	1639	247 C	370 C	34	38
PARTIAL COMPOSITE								
74.7 %@ 96.5		142	2167	1969	284	460	40	48
52.3 %@ 96.5		134	1935	1745	269	322	28	32
26.2 %@ 96.5		123	1587	1453	245	162	14	16

*** 2 INCH DECK 5.5 INCH SLAB ***

W 16 X 50		80.0	657		161.6			
B	St	Sb	I9	I14	M	ZVh	Studs	
95.1	425	131	2178	1962	262 S	530 S	46	54
90	409	131	2153	1934	261 S	530 S	46	54
84	390	130	2120	1898	260 S	530 S	46	54
80	377	129	2097	1872	259 S	530 S	46	54
75	360	129	2065	1838	258 S	530 S	46	54
72	350	129	2045	1816	257 S	530 S	46	54
40.1	232	122	1740	1507	234 C	358 C	32	38
PARTIAL COMPOSITE								
73.9 %@ 95.1		124	1964	1786	248	392	34	40
52.2 %@ 95.1		117	1755	1601	234	276	24	28
26.1 %@ 95.1		106	1434	1325	213	138	12	14

*** 2 INCH DECK 5.5 INCH SLAB ***

W 16 X 45		72.5	584		145			
B	St	Sb	I9	I14	M	ZVh	Studs	
95	407	119	1986	1798	237 S	478 S	42	50
90	393	118	1964	1773	236 S	478 S	42	50
84	375	118	1938	1741	235 S	478 S	42	50
80	362	117	1915	1719	235 S	478 S	42	50
75	346	117	1888	1688	233 S	478 S	42	50
72	337	116	1870	1669	233 S	478 S	42	50
40	223	111	1600	1391	222 S	358 C	32	38
PARTIAL COMPOSITE								
76.9 %@ 95		113	1813	1660	226	368	32	38
52.8 %@ 95		106	1603	1474	212	254	22	26
28.8 %@ 95		97	1337	1237	194	138	12	14

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 70 — 129 1160 256

B	St	Sb	Ip	I14	M		2Vh		Studs	
96.8	537	195	3362	2993	390	S	742	S	66	76
90	510	194	3304	2931	386	S	742	S	66	76
84	486	193	3247	2872	386	S	742	S	66	76
80	470	192	3207	2830	385	S	714	C	64	74
75	449	191	3152	2775	383	S	670	C	60	68
72	436	191	3118	2740	381	S	642	C	56	64
41.9	299	181	2653	2297	302	C	372	C	34	38

PARTIAL COMPOSITE

77.5 %@ 96.8	187	3099	2773	374	576	50	58	
52.1 %@ 96.8	177	2759	2466	354	392	34	38	
27.9 %@ 96.8	164	2329	2150	328	208	18	22	

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 64 — 118 1050 236

B	St	Sb	Ip	I14	M		2Vh		Studs	
96.7	519	179	3112	2782	358	S	680	S	60	70
90	494	179	3061	2726	356	S	680	S	60	70
84	470	177	3010	2672	355	S	680	S	60	70
80	454	177	2974	2634	353	S	680	S	60	70
75	434	176	2925	2584	352	S	670	C	60	68
72	422	175	2894	2552	351	S	642	C	56	66
41.7	289	167	2471	2142	292	C	372	C	34	38

PARTIAL COMPOSITE

77.7 %@ 96.7	172	2868	2557	344	530	46	52	
50.7 %@ 96.7	162	2518	2304	323	346	30	36	
27 %@ 96.7	156	2122	1936	300	184	16	18	

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 60 — 108 986 216

B	St	Sb	Ip	I14	M		2Vh		Studs	
95.8	510	169	3011	2696	337	S	638	S	56	66
90	489	168	2970	2651	336	S	638	S	56	66
84	466	167	2922	2600	334	S	638	S	56	66
80	450	167	2888	2563	333	S	638	S	56	66
75	430	166	2842	2514	332	S	638	S	56	66
72	417	165	2812	2484	331	S	638	S	56	66
40.6	279	157	2385	2065	282	C	362	C	32	38

PARTIAL COMPOSITE

75.8 %@ 95.6	161	2749	2493	322	484	42	50	
50.5 %@ 95.6	151	2426	2229	302	322	28	34	
25.3 %@ 95.6	139	2004	1839	277	162	14	16	

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 55 — 98.4 891 196.8

B	St	Sb	Ip	I14	M		2Vh		Studs	
95.5	493	155	2789	2499	309	S	584	S	52	60
90	473	154	2744	2460	308	S	584	S	52	60
84	450	153	2701	2418	307	S	584	S	52	60
80	435	153	2671	2388	306	S	584	S	52	60
75	416	152	2630	2346	304	S	584	S	52	60
72	404	152	2604	2319	303	S	584	S	52	60
40.5	269	144	2218	1924	272	C	362	C	32	38

PARTIAL COMPOSITE

78.9 %@ 95.5	148	2569	2312	297	460	40	46	
51.3 %@ 95.5	139	2244	2039	277	280	26	30	
27.6 %@ 95.5	128	1884	1729	256	162	14	16	

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 50 — 89.1 802 178.2

B	St	Sb	Ip	I14	M		2Vh		Studs	
95.5	476	141	2552	2305	281	S	530	S	46	54
90	457	140	2521	2270	280	S	530	S	46	54
84	435	140	2483	2229	279	S	530	S	46	54
80	421	139	2457	2200	278	S	530	S	46	54
75	402	139	2421	2161	277	S	530	S	46	54
72	391	138	2398	2136	276	S	530	S	46	54
40.5	260	132	2054	1787	263	C	362	C	32	38

PARTIAL COMPOSITE

73.9 %@ 95.5	133	2306	2102	267	392	34	40	
52.2 %@ 95.5	126	2066	1890	253	276	24	28	
26.1 %@ 95.5	115	1696	1571	231	138	12	14	

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 45 — 79 706 158

B	St	Sb	Ip	I14	M		2Vh		Studs	
95.5	455	126	2310	2097	253	S	476	S	42	48
90	437	126	2283	2067	252	S	476	S	42	48
84	417	125	2251	2031	251	S	476	S	42	48
80	403	125	2228	2005	250	S	476	S	42	48
75	385	124	2197	1971	249	S	476	S	42	48
72	375	124	2177	1949	248	S	476	S	42	48
40.5	249	119	1876	1637	237	S	362	C	32	38

PARTIAL COMPOSITE

77.4 %@ 95.5	121	2118	1911	241	368	32	36	
53.2 %@ 95.5	114	1876	1690	227	254	22	24	
29 %@ 95.5	104	1570	1457	209	138	12	14	

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 40 — 68.4 612 136.8

B	St	Sb	Ip	I14	M		2Vh		Studs	
94	431	113	2098	1903	225	S	424	S	38	44
90	418	112	2071	1985	225	S	424	S	38	44
84	399	112	2044	1852	224	S	424	S	38	44
80	386	111	2024	1829	223	S	424	S	38	44
75	369	111	1997	1799	222	S	424	S	38	44
72	359	111	1980	1780	221	S	424	S	38	44
39	232	106	1698	1483	211	S	348	C	32	36

PARTIAL COMPOSITE

75.8 %@ 94	107	1897	1761	214	322	28	34	
54.1 %@ 94	101	1698	1536	202	230	20	22	
27.1 %@ 94	91	1360	1295	183	116	10	12	

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 35 — 57.9 518 115.8

B	St	Sb	Ip	I14	M		2Vh		Studs	
94	404	98	1827	1675	196	S	370	S	34	38
90	393	98	1813	1659	195	S	370	S	34	38
84	375	97	1791	1632	194	S	370	S	34	38
80	363	97	1774	1614	194	S	370	S	34	38
75	348	96	1752	1588	193	S	370	S	34	38
72	338	96	1738	1572	192	S	370	S	34	38
39	219	92	1503	1319	184	S	348	C	32	36

PARTIAL COMPOSITE

80.6 %@ 94	94	1693	1518	187	300	26	28	
55.8 %@ 94	88	1495	1362	175	208	18	20	
31 %@ 94	80	1245	1171	160	116	10	12	

*** 2 INCH DECK 5.5 INCH SLAB ***

W 21 X 57 — 110 — 1140 — 220

B	St	Sb	I9	I14	M		2Vh		Studs	
96.2	571	176	3442	3103	340	S	584	S	52	60
90	545	169	3393	3049	338	S	584	S	52	60
84	519	168	3342	2993	337	S	584	S	52	60
80	501	168	3305	2952	335	S	584	S	52	60
75	478	167	3255	2899	334	S	584	S	52	60
72	465	166	3223	2866	333	S	584	S	52	60
41.2	312	159	2770	2412	316	C	368	C	32	38
PARTIAL COMPOSITE										
78.9 %@ 96.2		163	3184	2875	326		460		40	46
51.3 %@ 96.2		153	2788	2541	306		300		26	30
27.4 %@ 96.2		141	2350	2163	283		162		14	16

*** 2 INCH DECK 5.5 INCH SLAB ***

W 21 X 50 — 93.9 — 971 — 186.6

B	St	Sb	I9	I14	M		2Vh		Studs	
94.5	538	150	3083	2789	300	S	518	S	46	54
90	519	149	3052	2755	299	S	518	S	46	54
84	495	149	3008	2705	297	S	518	S	46	54
80	478	148	2976	2670	296	S	518	S	46	54
75	456	147	2934	2623	295	S	518	S	46	54
72	443	147	2906	2593	294	S	518	S	46	54
39.5	288	140	2477	2156	230	S	352	C	32	36
PARTIAL COMPOSITE										
75.4 %@ 94.5		142	2805	2560	285		392		34	40
53.2 %@ 94.5		135	2512	2300	269		276		24	28
26.6 %@ 94.5		122	2061	1911	245		138		12	14

*** 2 INCH DECK 5.5 INCH SLAB ***

W 21 X 44 — 81.6 — 843 — 163.2

B	St	Sb	I9	I14	M		2Vh		Studs	
94.5	513	134	2784	2530	269	S	468	S	42	48
90	496	134	2758	2499	268	S	468	S	42	48
84	472	133	2720	2456	267	S	468	S	42	48
80	456	133	2692	2425	266	S	468	S	42	48
75	436	132	2655	2384	265	S	468	S	42	48
72	423	132	2632	2358	264	S	468	S	42	48
39.5	275	126	2255	1966	251	S	352	C	32	36
PARTIAL COMPOSITE										
78.6 %@ 94.5		128	2564	2315	257		368		32	36
54.1 %@ 94.5		120	2270	2045	241		254		22	24
29.5 %@ 94.5		110	1897	1761	220		138		12	14

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 114 — 220 — 2040 — 440

B	St	Sb	I9	I14	M		2Vh		Studs	
99.8	658	315	5114	4479	631	S	892	C	78	90
96	641	314	5057	4424	629	S	856	C	76	88
90	613	313	4964	4334	620	C	804	C	70	82
84	584	311	4864	4240	591	C	750	C	66	76
80	565	309	4794	4174	572	C	714	C	64	74
75	541	308	4701	4088	547	C	670	C	60	68
72	526	306	4642	4034	533	C	642	C	56	66
44.8	388	292	3993	3469	393	C	400	C	36	42
PARTIAL COMPOSITE										
74.9 %@ 99.8		303	4700	4160	605		668		58	68
51.6 %@ 99.8		289	4249	3784	577		460		40	46
25.8 %@ 99.8		268	3602	3246	537		230		20	22

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 105 — 202 — 1850 — 404

B	St	Sb	I9	I14	M		2Vh		Studs	
99.8	637	291	4757	4176	582	S	890	C	78	90
96	619	290	4706	4126	580	S	856	C	76	88
90	592	289	4621	4043	577	S	804	C	70	82
84	564	287	4530	3955	571	C	750	C	66	76
80	546	286	4466	3894	553	C	714	C	64	74
75	522	284	4380	3814	529	C	670	C	60	68
72	508	283	4327	3764	514	C	642	C	56	66
44.8	372	270	3724	3231	377	C	400	C	36	42
PARTIAL COMPOSITE										
74.9 %@ 99.8		279	4366	3872	538		668		58	68
51.6 %@ 99.8		266	3939	3513	532		460		40	46
25.8 %@ 99.8		247	3327	3000	494		230		20	22

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 96 — 185 — 1680 — 370

B	St	Sb	I9	I14	M		2Vh		Studs	
99.8	616	267	4408	3884	534	S	890	C	78	90
96	600	266	4363	3839	532	S	856	C	76	88
90	573	265	4286	3763	530	S	804	C	70	82
84	546	263	4205	3683	527	S	750	C	66	76
80	528	262	4147	3627	525	S	714	C	64	74
75	505	261	4070	3553	511	C	670	C	60	68
72	491	260	4021	3507	497	C	642	C	56	66
44.8	358	248	3469	3018	363	C	400	C	36	42
PARTIAL COMPOSITE										
74.9 %@ 99.8		256	4041	3597	512		668		58	68
51.7 %@ 99.8		244	3641	3256	488		460		40	46
25.8 %@ 99.8		227	3067	2770	453		230		20	22

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 85 — 157 — 1440 — 314

B	St	Sb	I9	I14	M		2Vh		Studs	
96.8	577	235	3983	3515	471	S	864	C	76	88
90	548	234	3906	3437	468	S	804	C	70	82
84	522	233	3834	3364	465	S	750	C	66	76
80	504	232	3782	3312	464	S	714	C	64	74
75	482	230	3713	3245	461	S	670	C	60	68
72	468	230	3670	3203	459	S	642	C	56	66
41.8	324	217	3099	2680	328	C	374	C	34	38
PARTIAL COMPOSITE										
77.2 %@ 96.8		226	3674	3244	452		668		58	66
50.6 %@ 96.8		213	3248	2913	425		438		38	44
26.6 %@ 96.8		197	2752	2482	395		230		20	22

*** 2 INCH DECK 5.5 INCH SLAB ***

W 18 X 77 — 142 — 1290 — 284

B	St	Sb	I9	I14	M		2Vh		Studs	
96.8	556	214	3659	3243	428	S	818	S	72	84
90	528	213	3592	3173	426	S	804	C	70	82
84	503	212	3528	3107	424	S	750	C	66	76
80	486	211	3482	3061	422	S	714	C	64	74
75	464	210	3421	2999	420	S	670	C	60	68
72	451	209	3382	2961	418	S	642	C	56	66
41.8	311	199	2866	2478	314	C	372	C	34	38
PARTIAL COMPOSITE										
76 %@ 96.8		205	3355	3010	410		622		54	64
50.7 %@ 96.8		193	2976	2683	387		414		36	42
25.3 %@ 96.8		178	2482	2298	357		208		18	22

*** 2 INCH DECK 5.5 INCH SLAB ***

W 24 X 61 — 130 — 1540 — 260

B	St	Sb	I9	I14	M		2Vh		Studs	
95	660	202	4527	4060	405	S	648	S	58	66
90	634	202	4472	4000	403	S	648	S	58	66
84	603	201	4401	3923	401	S	648	S	58	66
80	582	200	4350	3869	400	S	648	S	58	66
75	556	199	4282	3797	398	S	648	S	58	66
72	539	198	4238	3751	397	S	642	C	56	66
40	355	188	3590	3117	359	C	358	C	32	38
PARTIAL COMPOSITE										
78.1 %@ 95		194	4180	3742	388		506		44	50
53.2 %@ 95		183	3720	3356	366		346		30	34
28.4 %@ 95		169	3132	2861	337		184		16	18

*** 2 INCH DECK 5.5 INCH SLAB ***

W 24 X 55 — 114 — 1340 — 228

B	St	Sb	I9	I14	M		2Vh		Studs	
95	631	181	4092	3686	363	S	584	S	52	60
90	607	181	4045	3633	361	S	584	S	52	60
84	578	180	3984	3566	360	S	584	S	52	60
80	558	179	3939	3518	358	S	584	S	52	60
75	532	178	3880	3454	357	S	584	S	52	60
72	516	178	3842	3413	356	S	584	S	52	60
40	338	169	3269	2841	337	S	358	C	32	38
PARTIAL COMPOSITE										
78.9 %@ 95		174	3784	3413	348		460		40	46
51.3 %@ 95		162	3310	3014	324		300		26	30
27.6 %@ 95		149	2786	2563	299		162		14	16

*** 2 INCH DECK 5.5 INCH SLAB ***

W 21 X 112 — 250 — 2620 — 500

B	St	Sb	I9	I14	M		2Vh		Studs	
101	763	345	6302	5551	691	S	902	C	80	92
96	737	344	6215	5466	688	S	856	C	76	88
90	705	342	6105	5360	685	S	804	C	70	82
84	672	340	5987	5247	680	C	750	C	66	76
80	650	339	5904	5169	658	C	714	C	64	74
75	622	337	5794	5067	630	C	670	C	60	68
72	605	336	5724	5003	613	C	642	C	56	66
46	454	322	4994	4363	460	C	410	C	36	42
PARTIAL COMPOSITE										
76.5 %@ 101		333	5841	5190	667		690		60	70
51 %@ 101		318	5250	4703	636		460		40	46
25.5 %@ 101		298	4480	4125	596		230		20	24

*** 2 INCH DECK 5.5 INCH SLAB ***

W 21 X 96 — 198 — 2100 — 396

B	St	Sb	I9	I14	M		2Vh		Studs	
97	692	291	5455	4803	582	S	866	C	76	88
90	656	289	5344	4693	578	S	804	C	70	82
84	624	287	5243	4593	575	S	750	C	66	76
80	603	286	5171	4523	572	S	714	C	64	74
75	577	285	5075	4432	569	S	670	C	60	68
72	560	283	5015	4375	567	S	642	C	56	66
42	392	269	4242	3682	397	C	376	C	34	38
PARTIAL COMPOSITE										
77 %@ 97		280	5044	4448	559		668		58	66
50.5 %@ 97		264	4483	4017	528		438		38	44
26.6 %@ 97		246	3829	3456	492		230		20	22

*** 2 INCH DECK 5.5 INCH SLAB ***

W 21 X 82 — 169 — 1760 — 338

B	St	Sb	I9	I14	M		2Vh		Studs	
97	653	250	4762	4220	500	S	866	C	76	88
90	619	248	4673	4127	497	S	804	C	70	82
84	589	247	4589	4042	494	S	750	C	66	76
80	569	246	4529	3982	492	S	714	C	64	74
75	544	245	4449	3903	489	S	670	C	60	68
72	528	244	4399	3854	488	S	642	C	56	66
42	366	231	3736	3242	370	C	374	C	34	38
PARTIAL COMPOSITE										
77.1 %@ 97		240	4396	3898	486		668		58	66
50.5 %@ 97		226	3893	3505	453		438		38	44
26.6 %@ 97		211	3308	2994	421		230		20	22

*** 2 INCH DECK 5.5 INCH SLAB ***

W 21 X 73 — 151 — 1600 — 302

B	St	Sb	I9	I14	M		2Vh		Studs	
96.3	638	226	4459	3970	452	S	774	S	68	80
90	608	225	4386	3893	449	S	774	S	68	80
84	578	224	4311	3815	447	S	750	C	66	76
80	558	223	4257	3760	445	S	714	C	64	74
75	533	222	4186	3687	443	S	670	C	60	68
72	518	221	4140	3642	442	S	642	C	56	66
41.3	352	210	3515	3051	357	C	368	C	34	38
PARTIAL COMPOSITE										
77.3 %@ 96.3		217	4113	3676	433		598		52	60
50.5 %@ 96.3		204	3632	3295	408		392		34	40
26.7 %@ 96.3		190	3379	2799	379		208		18	20

*** 2 INCH DECK 5.5 INCH SLAB ***

W 21 X 68 — 140 — 1480 — 280

B	St	Sb	I9	I14	M		2Vh		Studs	
96.3	622	211	4190	3743	421	S	720	S	64	74
90	593	210	4124	3673	419	S	720	S	64	74
84	564	209	4055	3601	417	S	720	S	64	74
80	545	208	4006	3550	416	S	714	C	64	74
75	520	207	3941	3482	414	S	670	C	60	68
72	505	206	3899	3440	412	S	642	C	56	66
41.3	343	196	3821	2885	347	C	368	C	34	38
PARTIAL COMPOSITE										
76.7 %@ 96.3		202	3853	3466	404		552		48	56
51.1 %@ 96.3		190	3417	3116	381		368		32	38
25.6 %@ 96.3		176	2850	2606	351		184		16	18

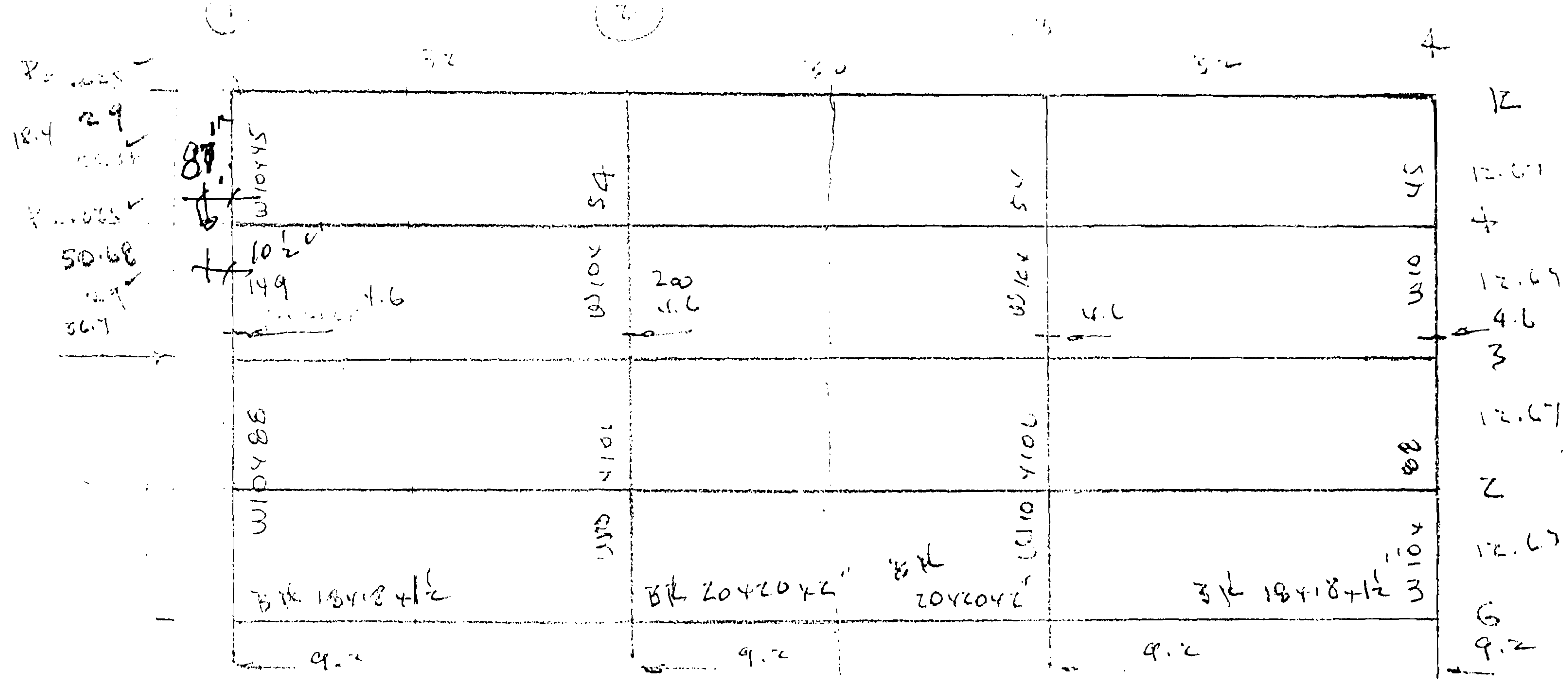
*** 2 INCH DECK 5.5 INCH SLAB ***

W 21 X 62 — 127 — 1330 — 254

B	St	Sb	I9	I14	M		2Vh		Studs	
96.2	601	193	3862	3464	385	S	658	S	58	68
90	573	192	3804	3401	383	S	658	S	58	68
84	545	191	3743	3336	381	S	658	S	58	68
80	527	190	3700	3290	380	S	658	S	58	68
75	503	189	3642	3228	378	S	658	S	58	68
72	488	189	3604	3190	377	S	642	C	56	66
41.2	330	180	3081	2679	334	C	368	C	32	38
PARTIAL COMPOSITE										
76.8 %@ 96.2		184	3549	3216	369		506		44	52
52.4 %@ 96.2		174	3162	2855	349		346		30	34
27.9 %@ 96.2		162	2668	2500	323		184		16	20

TB-line C F

43.7



331.81   448.3   448.3   331.81

5   5   5   5.0

30.0   30.0

453.3   366.8

P = 366.8

P' = .273 (9.2 × 8.8) 12 / 1.32 = 199.4

P = 566

P_T = 65[illegible]

P' = .263 (4.6 × 8.8) 12 / 1.37 = 96.0

M = 87.4 + 10.5/12 = 76.5 in

P' = .261 (76.5) 12 = 239

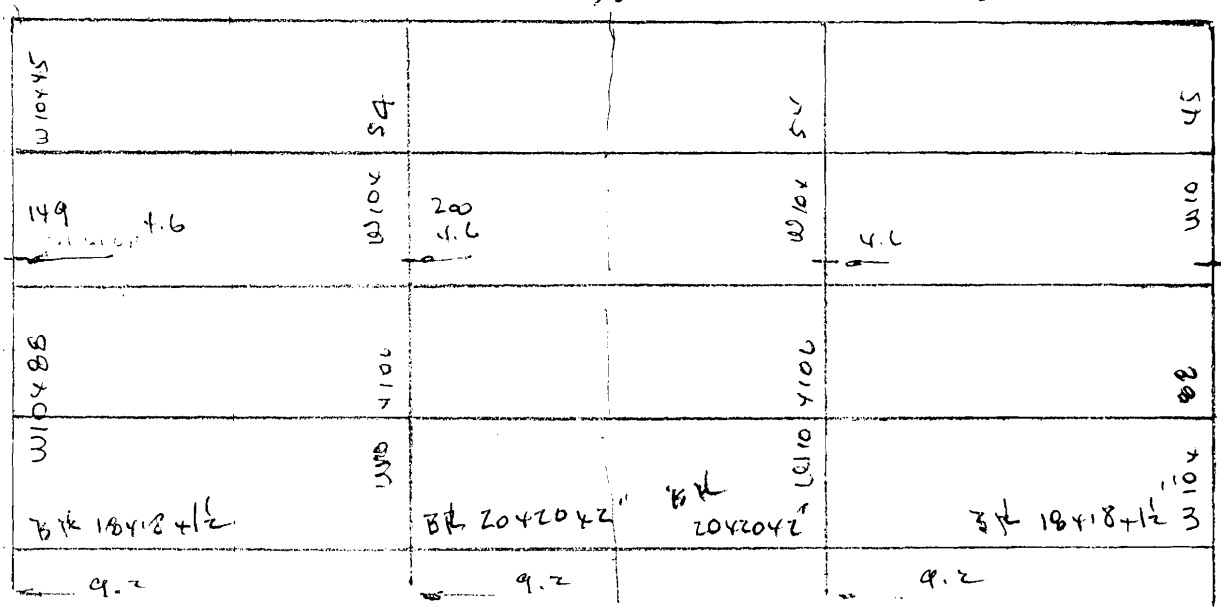
P_T = 566 + 239 = 805

11-13-06

Leave Alone.

Do not Reframe 4th Fl.

TS - line C



331.8
5
30.0

448.3
5
453.3

448.3
5

331.8
5.01
30.0
366.8

$P_T = 65^{k}$

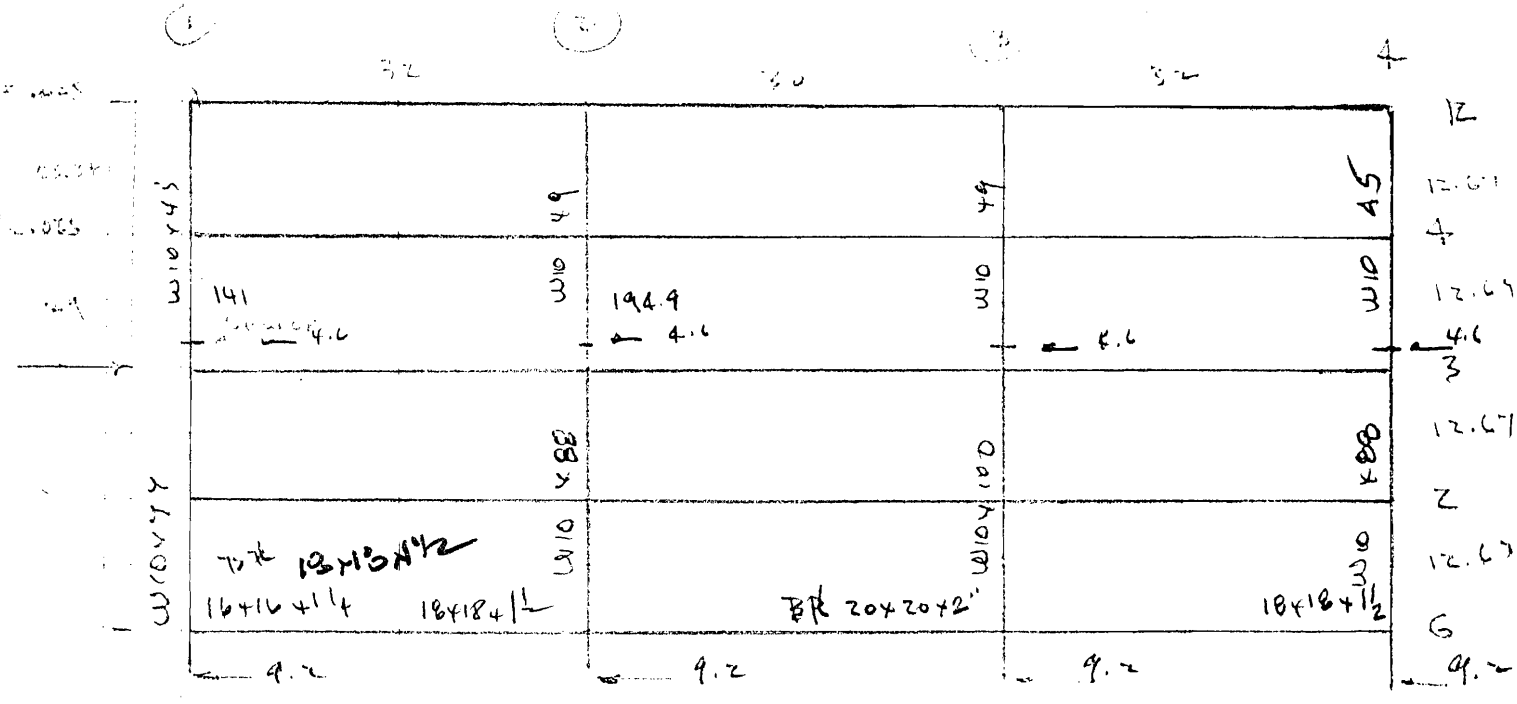
P_T 366.8

$P' = \frac{.263\,(9.2 \times 8.8)^{1.6}}{1.52} = 199.4$

P_T 566

$P' = \frac{.263\,(4.6 \times 8.8)^{1.6}}{1.52} = 96.0$

D Link E.



281.5
5
30
316.5
192
508.5

141
96
237

349
5
384
192
576

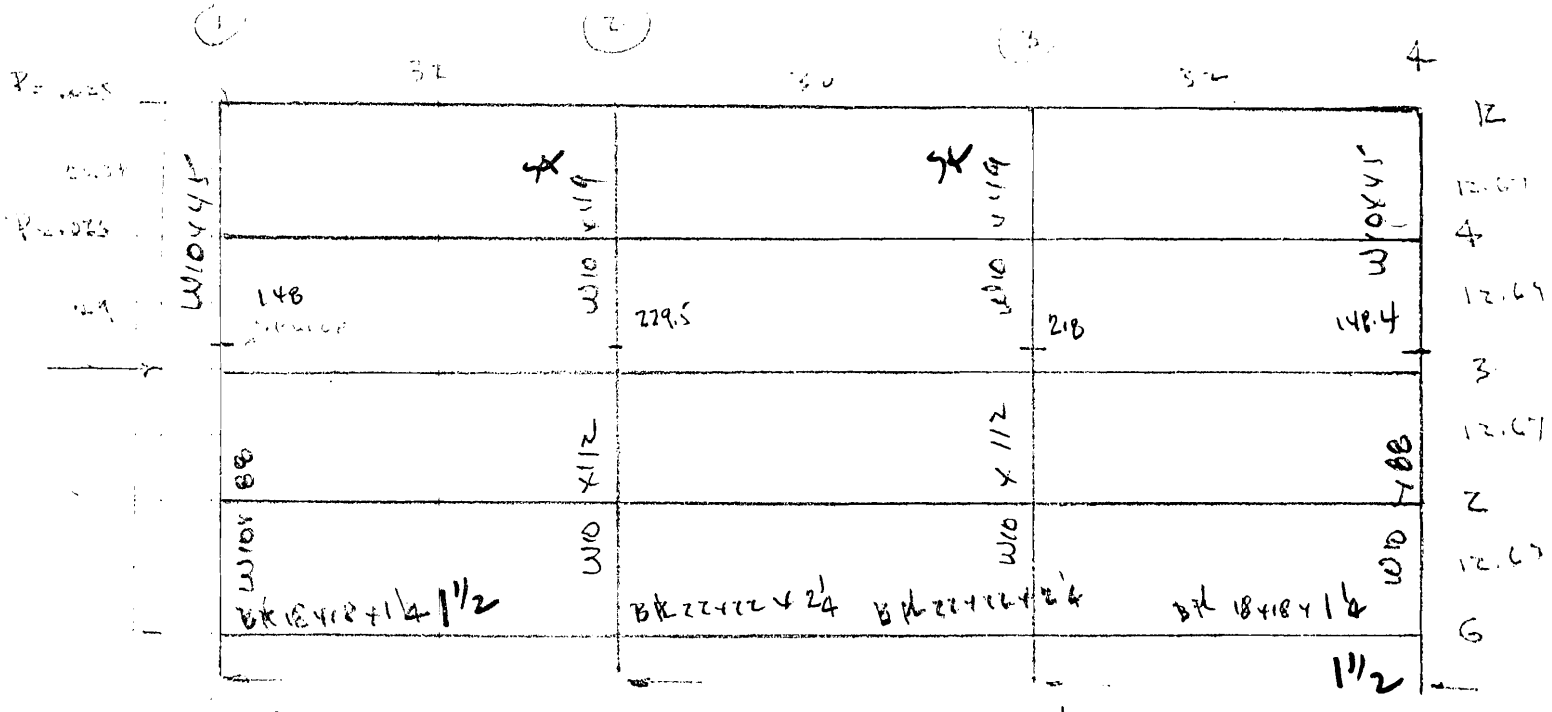
194.4
96
290.4

462
5
469
192
654

329
5
30
364
192
556

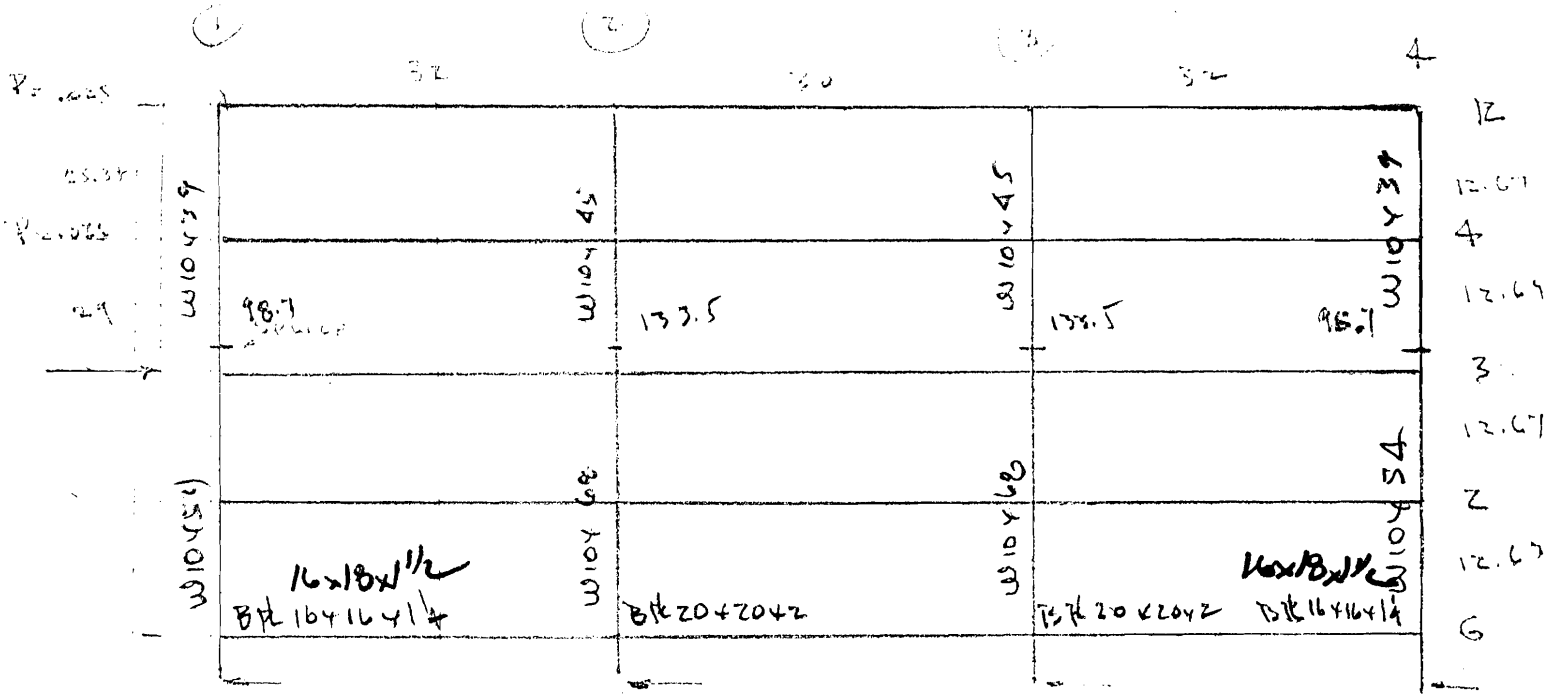
P' =

6 Line



	231.8	528	501	357
	5	5	5	5
	30			30
ΣP_c	366.8	533	506	592
$\Sigma P'$	199.4	199.4	199.1	199.4
	566.2	732.4	705.4	591.4
ΣP_r	148	229.5	218	148.4
	96	96	96	96
	244	325.5	314	244.4

H Line



243.4
105.8
349.2

98.7
54.2
152.9

343.1
105.8
448.9

133.5
54.2
187.7

306.2
105.8
412

133.5
54.2
187.7

221.3
105.8
327

98.7
54.2
152.9

P'

P+

ROBERT E. CHESTER ASSOCIATES
706 Fayette Street
CONSHOHOCKEN, PA 19428
(215) 828-3674

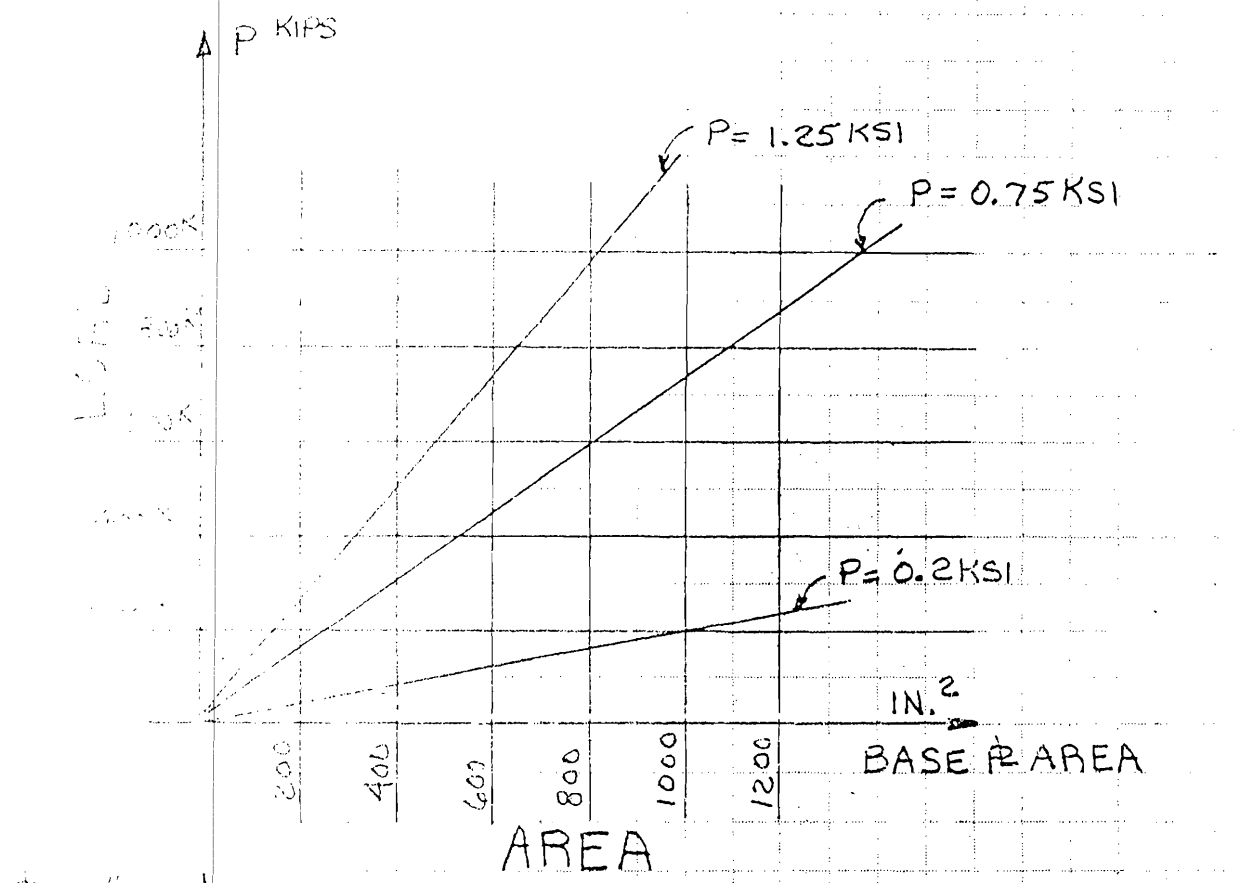
JOB BASE PLATE DESIGN CHART

SHEET NO. ____ OF ____

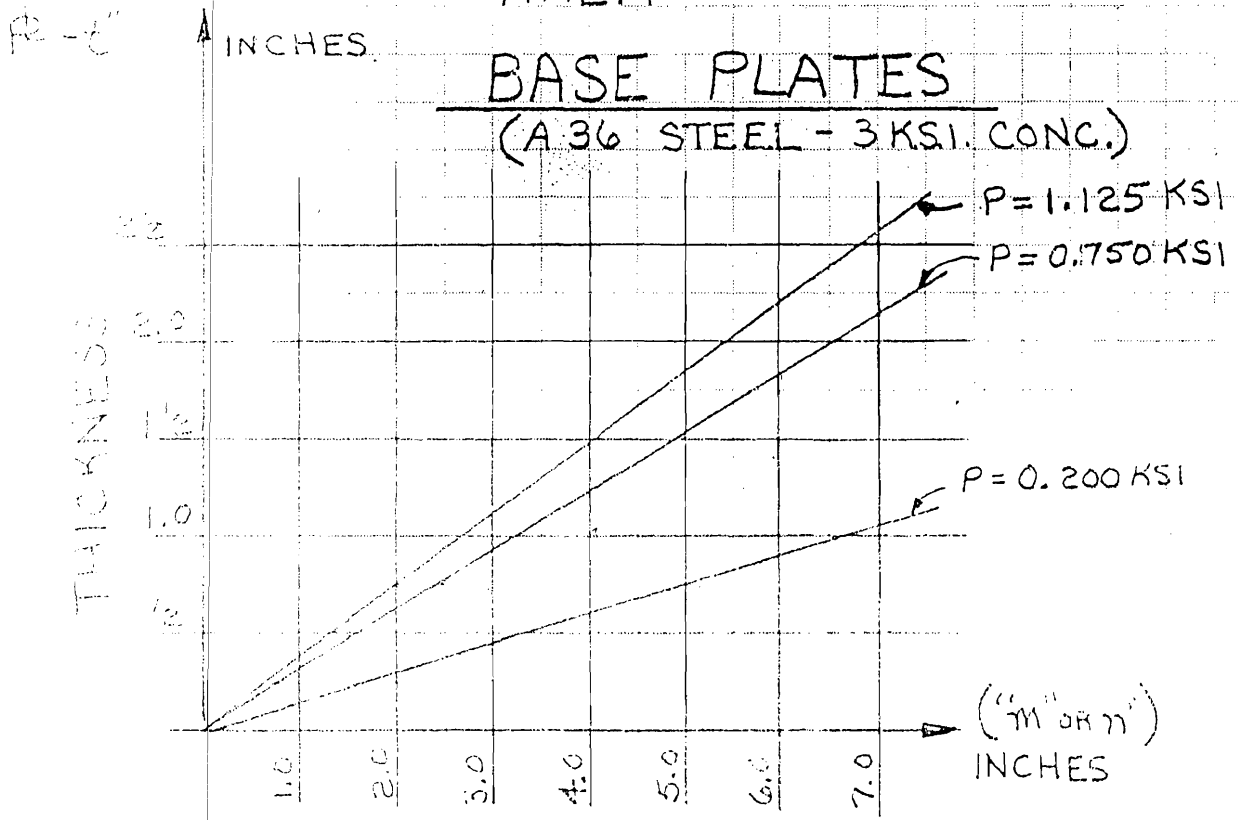
CALCULATED BY ____ DATE ____

CHECKED BY ____ DATE ____

SCALE ____



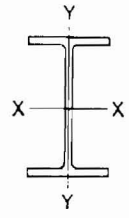
BASE PLATES
(A 36 STEEL - 3 KSI. CONC.)



F_y = 36 ksi

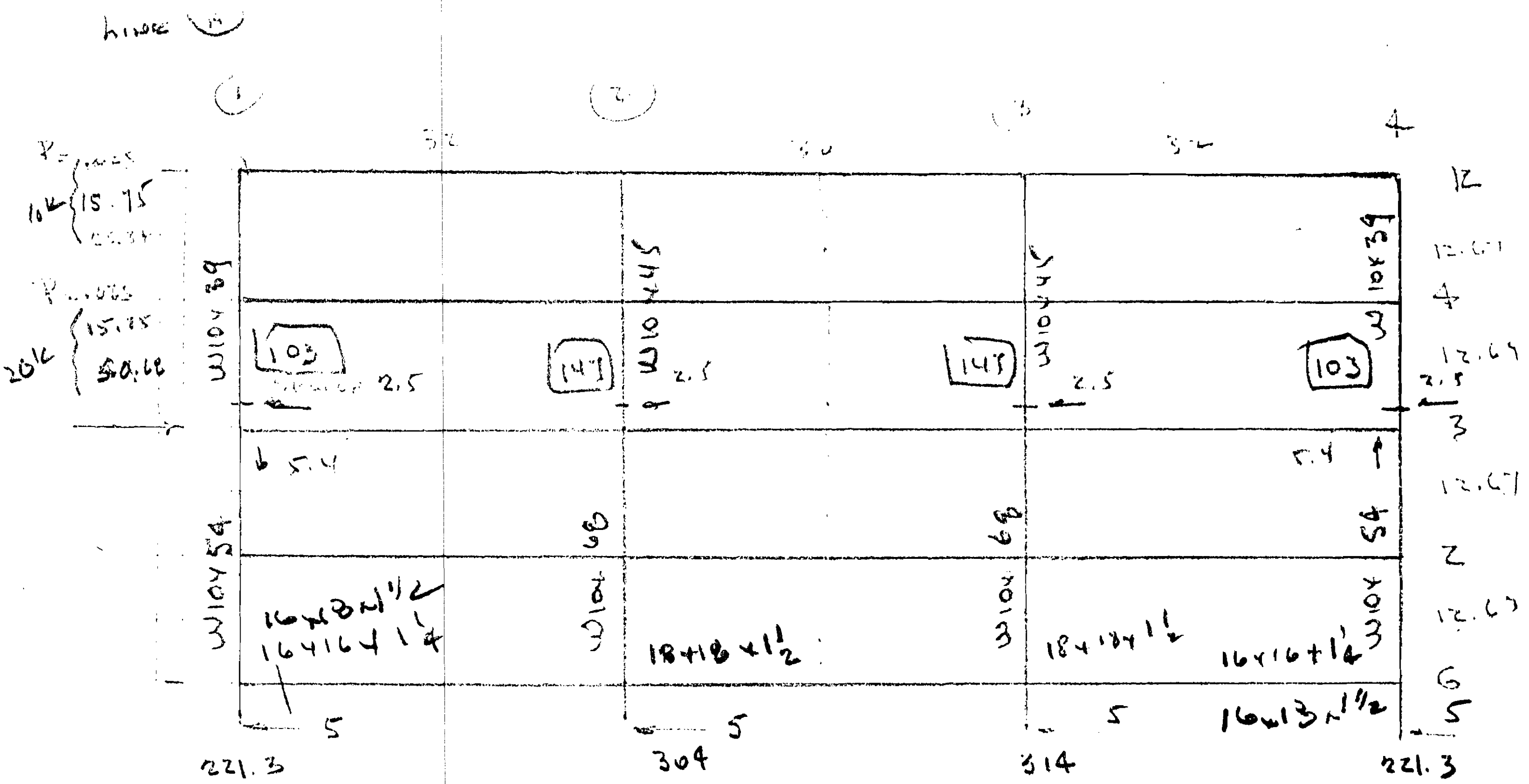
F_y = 50 ksi

COLUMNS
W shapes
Allowable axial loads in kips



Designation		W10											
Wt./ft		60		54		49		45		39		33	
F_y		36	50	36	50	36	50	36	50	36	50	36	50
Effective length in ft KL with respect to least radius of gyration r_y	0	380	528	341	474	311	432	287	399	248	345	210	291
	6	353	482	317	433	289	394	260	351	224	303	189	255
	7	348	472	312	423	284	385	253	340	218	293	184	246
	8	341	461	306	414	279	376	247	328	213	283	179	237
	9	335	450	300	403	273	367	240	316	206	272	173	228
	10	328	437	294	392	268	357	232	303	200	260	167	217
	11	321	425	288	381	262	346	224	289	193	248	161	207
	12	313	412	281	369	256	335	216	274	186	235	155	196
	13	306	398	274	356	249	324	208	259	178	221	149	184
	14	297	383	267	343	242	312	199	243	170	207	142	171
	15	289	368	259	330	235	299	190	227	162	193	135	159
	16	280	353	251	316	228	286	180	209	154	177	127	145
	17	271	337	243	301	221	273	170	191	145	161	120	131
	18	262	320	235	286	213	259	160	172	136	144	112	117
	19	253	303	226	271	205	245	149	154	126	130	103	105
	20	243	285	217	255	197	230	138	139	116	117	95	95
	22	222	248	199	221	180	198	115	115	97	97	78	78
	24	201	209	179	186	161	167	97	97	81	81	66	66
	26	177	178	158	159	142	143	82	82	69	69	56	56
	28	154	154	137	137	123	123	71	71	60	60	48	48
	30	134	134	119	119	107	107	62	62	52	52	42	42
	32	118	118	105	105	94	94	54	54	46	46	37	37
	33	111	111	99	99	88	88	51	51	43	43		
	34	104	104	93	93	83	83						
	36	93	93	83	83	74	74						
Properties													
U		2.55	2.55	2.56	2.56	2.57	2.57	3.25	3.25	3.28	3.28	3.35	3.35
P_{wo} (kips)		99	138	83	116	73	101	79	109	64	89	55	77
P_{wi} (kips/in.)		15	21	13	19	12	17	13	18	11	16	10	15
P_{wb} (kips)		239	282	163	193	127	149	138	163	101	119	79	93
P_{fb} (kips)		104	145	85	118	71	98	86	120	63	88	43	59
L_c (ft)		10.6	9.0	10.6	9.0	10.6	9.0	8.5	7.2	8.4	7.2	8.4	7.1
L_u (ft)		31.1	22.4	28.2	20.3	26.0	18.7	22.8	16.4	19.8	14.2	16.5	11.9
A (in.^{2})		17.6		15.8		14.4		13.3		11.5		9.71	
I_x (in.^{4})		341		303		272		248		209		170	
I_y (in.^{4})		116		103		93.4		53.4		45.0		36.6	
r_y (in.)		2.57		2.56		2.54		2.01		1.98		1.94	
Ratio r_x/r_y		1.71		1.71		1.71		2.15		2.16		2.16	
B_x } Bending		0.264		0.263		0.264		0.271		0.273		0.277	
B_y } factors		0.765		0.767		0.770		1.000		1.018		1.055	
$a_x/10^6$		50.5		45.0		40.6		37.2		31.2		25.4	
$a_y/10^6$		17.3		15.4		13.8		8.0		6.7		5.4	
F'_{ex} $(K_x L_x)^2/10^2$ (kips)		200		198		196		194		189		182	
F'_{ey} $(K_y L_y)^2/10^2$ (kips)		68.5		68.0		66.9		41.9		40.7		39.0	

Note: Heavy line indicates KL/r of 200.



10.7

$\frac{20 \times 25.31}{47} = 10.7$

C1 W15K

10.7

236.6

309

319

$\frac{10 \times 25.31}{47} = 5.4$

236.6

$F_p = 122T$

KL = 17

319
105

424

$P = 236.6$

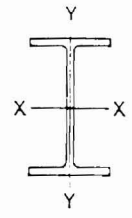
$P' = \frac{.264 \times (5 + 8.8)\ 12}{1.33} = 104.8$

$P_T = 341.4$

$P = 103$

$P' = \frac{.273\ (2.5 + 8.8)\ 12}{1.33} = 54.2$

$P_T = 157.2$



F_y = 36 ksi

F_y = 50 ksi

COLUMNS
W shapes
Allowable axial loads in kips

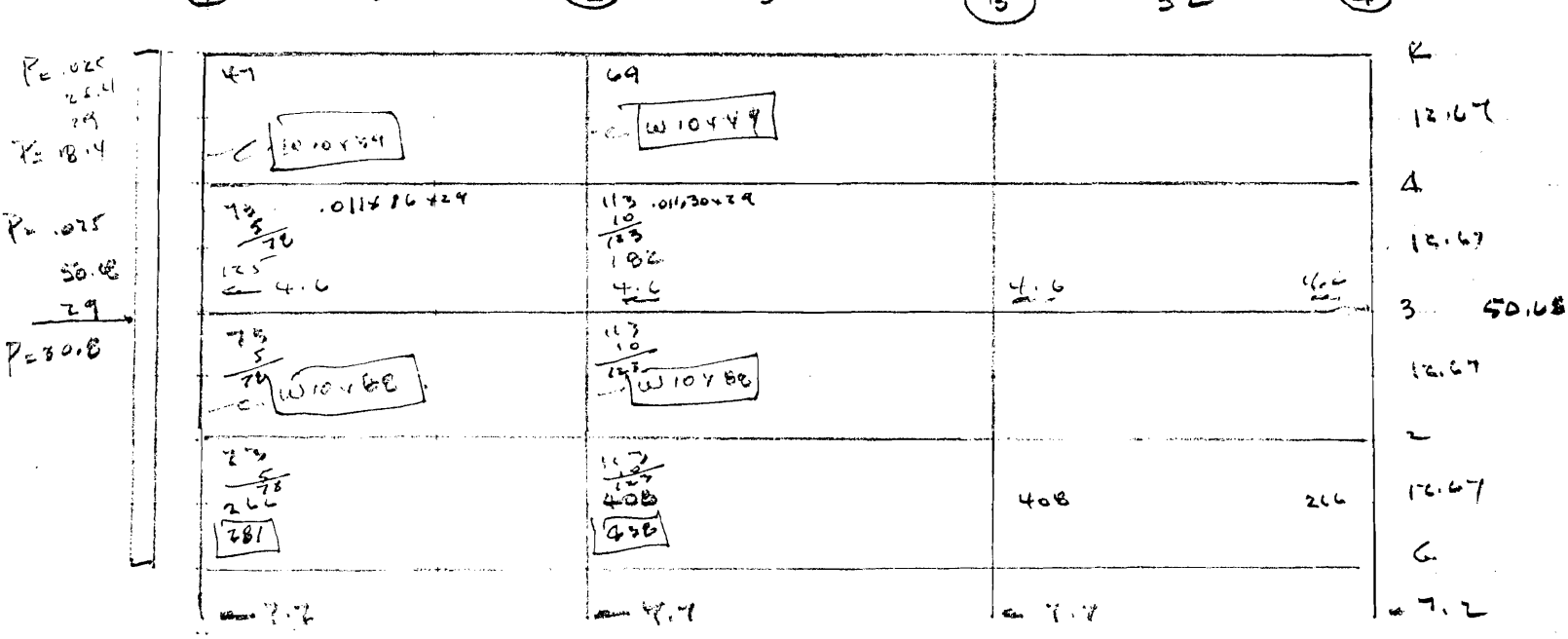
Designation		W10									
Wt./ft		112		100		88		77		68	
F_y		36	50	36	50	36	50	36	50	36	50
Effective length in ft KL with respect to least radius of gyration r_y	0	711	987	635	882	559	777	488	678	432	600
	6	663	906	592	808	521	712	454	620	402	548
	7	653	888	583	792	513	697	447	607	395	537
	8	642	869	573	775	504	682	439	593	388	525
	9	631	848	562	756	495	665	431	579	381	512
	10	619	827	551	737	485	648	422	564	373	498
	11	606	805	540	717	475	630	413	548	365	484
	12	593	782	528	696	464	611	404	531	357	469
	13	579	757	516	674	453	591	394	513	348	454
	14	565	732	503	651	442	571	384	495	339	437
	15	550	706	489	627	430	550	373	476	330	421
	16	535	679	476	602	417	528	362	457	320	403
	17	519	651	461	577	405	505	351	437	310	385
	18	503	622	446	550	392	481	339	416	299	366
	19	486	591	431	523	378	457	327	394	289	347
	20	469	560	416	494	364	432	315	371	278	327
	22	433	495	383	435	335	379	289	324	255	285
	24	395	425	348	372	304	323	261	275	230	242
	26	355	362	312	317	271	275	232	234	204	206
	28	313	313	273	273	237	237	202	202	177	177
	30	272	272	238	238	206	206	176	176	155	155
	32	239	239	209	209	181	181	155	155	136	136
	34	212	212	185	185	161	161	137	137	120	120
	36	189	189	165	165	143	143	122	122	107	107
	38	170	170	148	148	129	129	110	110	96	96
	40	153	153	134	134	116	116	99	99	87	87
Properties											
U		2.45	2.45	2.46	2.46	2.49	2.49	2.51	2.51	2.52	2.52
P_{wo} (kips)		255	354	214	298	177	246	143	199	116	162
P_{wt} (kips/in.)		27	38	24	34	22	30	19	27	17	24
P_{wb} (kips)		1388	1636	1014	1196	714	842	480	566	335	395
P_{tq} (kips)		352	488	282	392	221	306	170	237	133	185
L_c (ft)		11.0	9.3	10.9	9.3	10.8	9.2	10.8	9.1	10.7	9.1
L_u (ft)		53.2	38.3	48.2	34.7	43.3	31.2	38.6	27.8	34.8	25.1
A (in.^{2})		32.9		29.4		25.9		22.6		20.0	
I_x (in.^{4})		716		623		534		455		394	
I_y (in.^{4})		236		207		179		154		134	
r_y (in.)		2.68		2.65		2.63		2.60		2.59	
Ratio r_x/r_y		1.74		1.74		1.73		1.73		1.71	
B_x } Bending		0.261		0.263		0.263		0.263		0.264	
B_y } factors		0.726		0.735		0.744		0.751		0.758	
$a_x/10^6$		106.5		92.7		79.5		67.9		58.7	
$a_y/10^6$		35.2		30.8		26.7		22.8		20.0	
F'_{ex} $(K_x L_x)^2/10^2$ (kips)		225		219		214		209		204	
F'_{ey} $(K_y L_y)^2/10^2$ (kips)		74.5		72.8		71.7		70.1		69.6	

CONN.

94'

7-19-06

SD-3.1



Spandrel Col

Typ W10x

P_D = 281 / 266

$M = 7.2 \times 8.8 = 63.4$

$L = 12.8 - 1.8 = 11$

$P' = \frac{.264 \times 63.4 \times 12}{1.33} = 151$

$Kl = 11 \times 1.2 = 13.2$

$2 = 13$

P_T = 417 / 432 W10x68

Interior Col

438

408

151

P_T 559 / 589 W10x88

Spandrel Col

P = 125 / 130

$M = 4.6 \times 8.8 = 40.5$

$P' = \frac{.264 \times 40.5 \times 12}{1.33} = 96.5$ / 227

P_T = 227 + 15 W10x39

Interior Col

P = 182 / 192

96.5

279 / 289 W10x49

$R = v(A-150)$

$.08(868-150) = 57.4\%$

$R = 57.4 \rightarrow 40\%$

Spandrel Beams $L = 32'$ Sp 3.75

$$L = L_0\left[.25 + \frac{15}{\sqrt{K_{LL} A_T}}\right]$$

$$70\left[1.218\right] \quad \frac{15.5}{\frac{2}{1}} \quad \frac{120}{1}$$

$L = 85.3$ Can't Reduce

$R = v(A-150)$ $A = 120$

$.08(-30)$ Can't Reduce

Spandrel Girders Can't Reduce By Inspection

Interior Cols

$$L = \underset{50}{L_0}\left[.25 + \frac{15}{\sqrt{K_{LL} A_T}}\right]$$

$A_T = 32+30 = 960$

$K_{LL} = 4$

$$\frac{15}{\sqrt{4}\ \ 960}$$

$L = 50 + 24.6 + 20 = \boxed{44.6\ \#/\square'}$

LLR $\frac{45\ \#/\square'}{70\ \#/\square'} = .64$ Not in Cantilever Cols.

$R = .08\left(\underset{810}{960} - 150\right) = 64.8\% > 60$

Exterior Cols

$A_T = 480$

$K = 4$

$L = 50\left[.25 + \frac{15}{\sqrt{4+480}}\right]$

$29.6 + 20 = \boxed{49.6\ \#/\square'}$

LLR $\frac{57}{70}$ $\therefore R1$

$36.8 + 20 = \boxed{56.8\ \#/\square'}$

$R = .08\ 330 = 26.4\% < 60$

Live Load Reduction

Beams Interior

L_o 32' Span = 7'-6"

LL = 50

Partn .20

$$L = L_o \left[.25 + \frac{15}{\sqrt{K_{LL} A_T}} \right]$$

$K_{LL} = 2$

$A_T = 240$

$$50\ 70 \left[.25 + \frac{15}{\sqrt{21.9}} \right] \quad .605 \quad .93$$

$L =$ 65.4 #/ft

$L =$ 46.5 #/ft + 20 = 66.5 #/ft

65 #/ft

$R = .08 + \left(\frac{A - 150}{240 - 150} \right)$

$R = .08 + 90 = 7.2\%$

70 × .072 = 5.04 #/ft 65 #/ft

50 × .072 = 3.6 #/ft 46 + 20 = 66 #/ft

$R = 23.1 \left(1 + D/L_o \right)$

$R = 23.1 \left(1 + \frac{66}{70} \right) = 44.9$ 740

$R = 23.1 \left(1 + \frac{66}{50} \right) = 53.6$ 740 (1.94)

D.L

L.L 70 50

Girders

Interior

$L = L_o \left[.25 + \frac{15}{\sqrt{2 \times 868}} \right]$ (.36, .161, 41.66)

L_2 70 × .61 = 42.7

$L =$ 30.5 + 20 = 50.5

L = 28 Sp = 31'

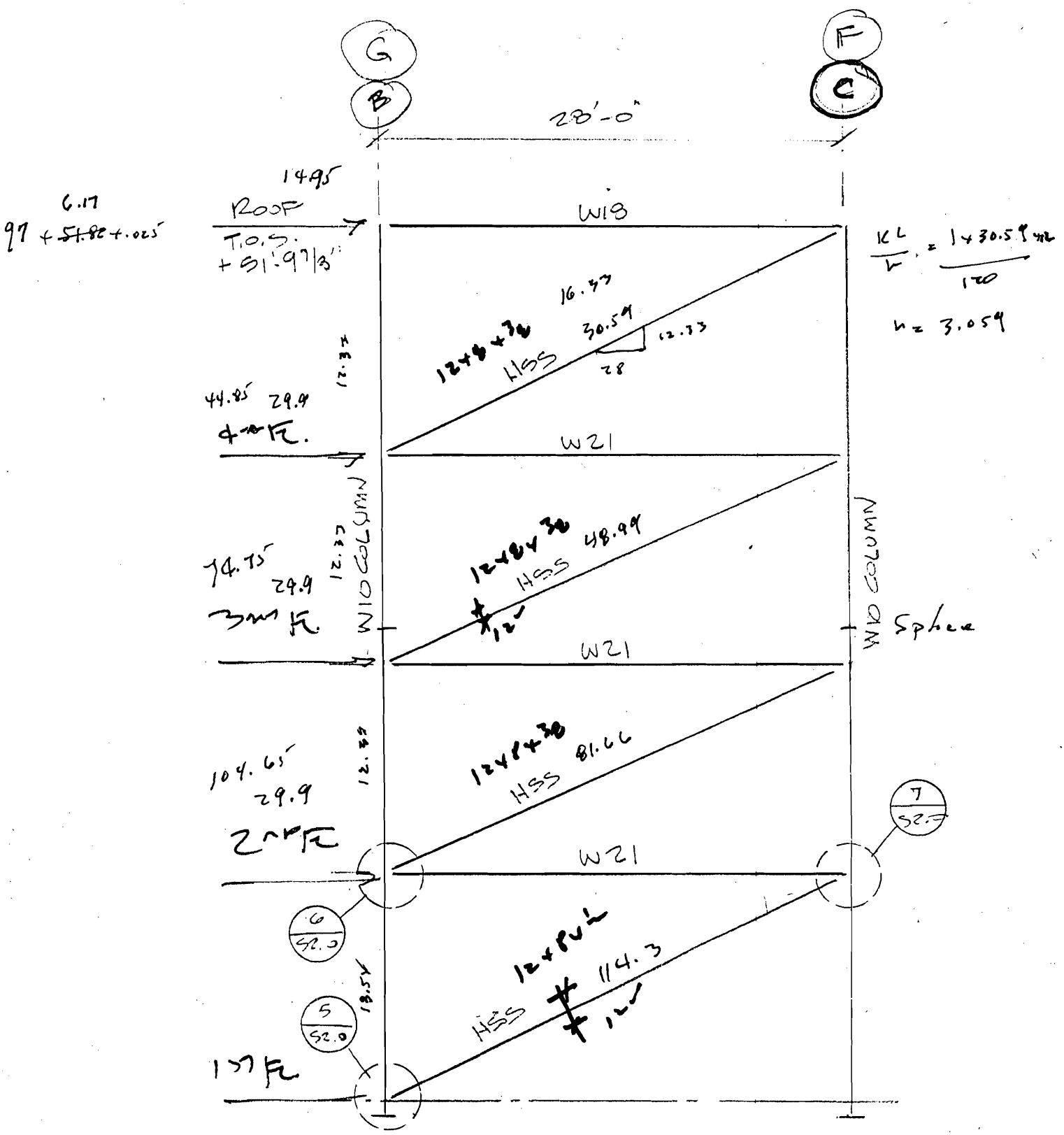
LL = 50

Partn = 20

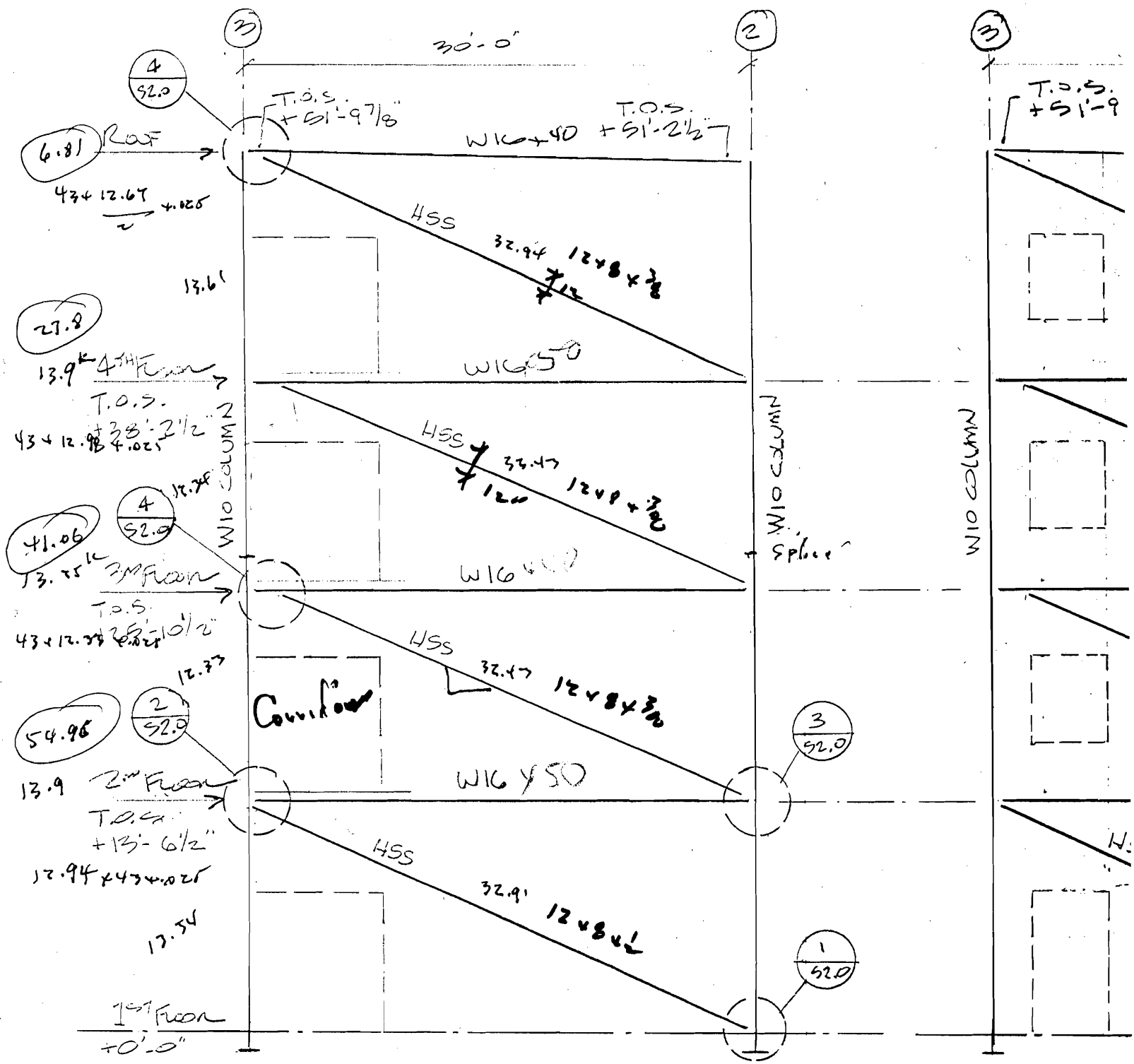
55 #/ft

60 D.L

115


G
B
F
C
28'-0"
14.95
ROOF
T.O.S.
+51'-9 1/8"
W18
16.37
12x8x3/8
HSS
30.59
12.33
28
W21
44.85
29.9
4TH FL.
W10 COLUMN
14.75
29.9
3RD FL.
12x8x3/8
HSS
48.99
W21
W10 COLUMN
Sphere
104.65'
29.9
2ND FL.
12x8x3/8
HSS
81.66
W21
7
S2.1
6
S2.3
5
S2.0
12x8x1/2
HSS
114.3
1ST FL.

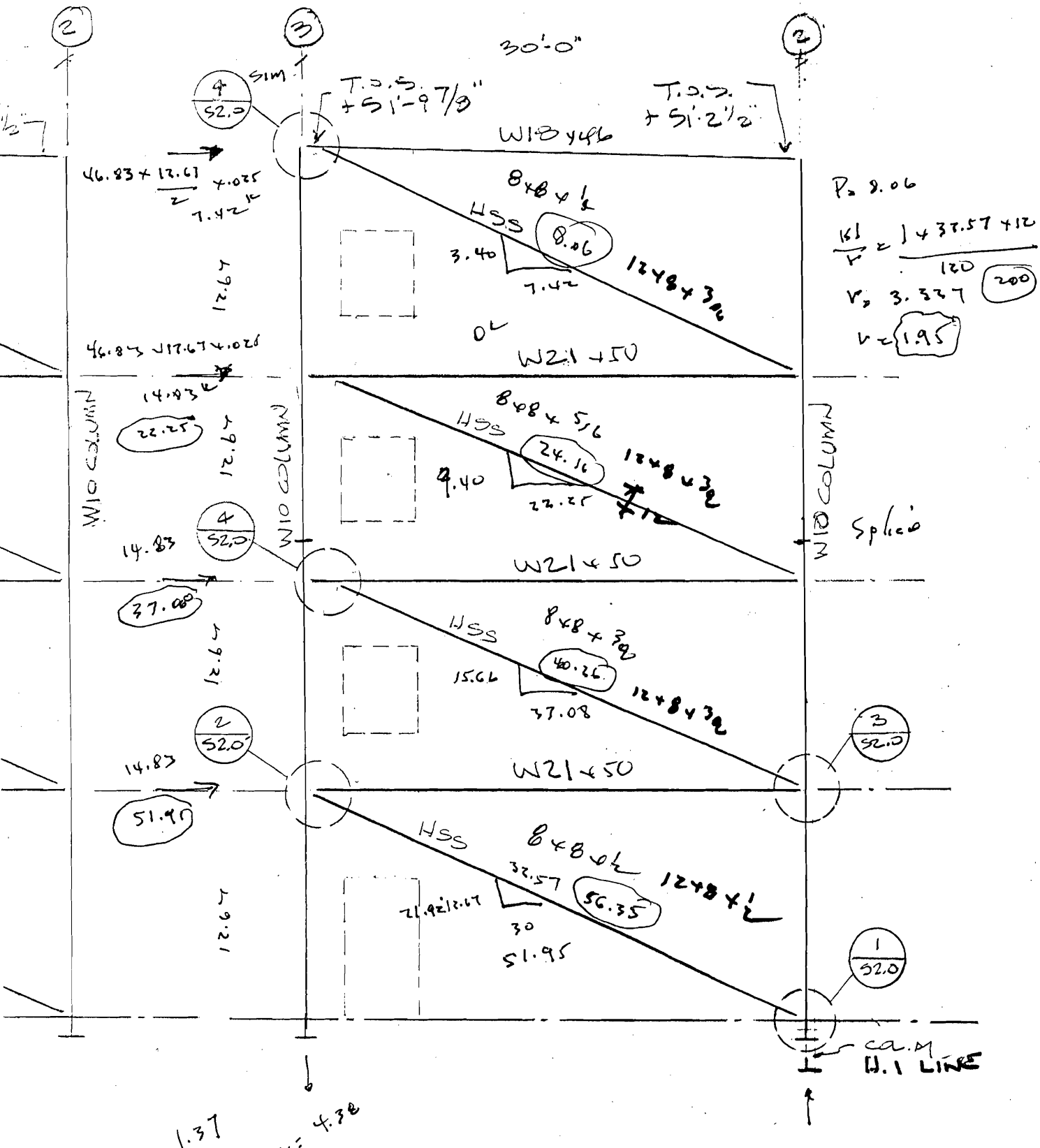
3 LINE



BAND E LINES

BRACED FRAME ELEVATIONS

1/8" = 1'-0"

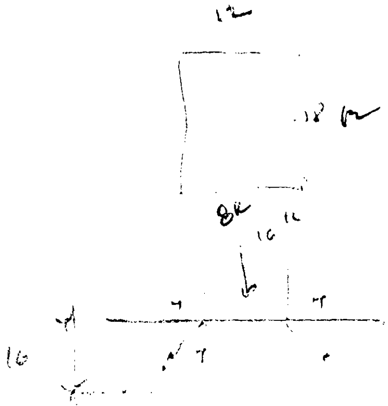


$\frac{v_t}{\phi} = 1.37$

$v_t = 1.37 + 3.00 = 4.38$

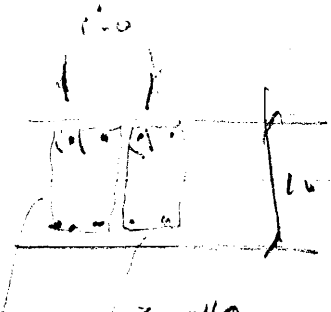
A.1 AND H.1 LINES

End Walls



Contact Area

104
116
52 + 64 13.5
(26) = + (52×2) + 14 + .110 154.4



M = 46.7

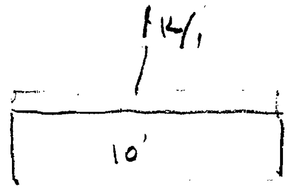
$A_s = \frac{46.7}{1.76 \times 14} = 1.88\ in^2/'$ @ Floor Location

3 - #8
#8 @ 4"

$\frac{9.7}{1.76 \times 14} = .39\ in^2/'$ #5 @ 8 $A_s = .44$

$A_s = .0025 \times 12 \times 14 =$ #5 @ 8 $A_s = .47$

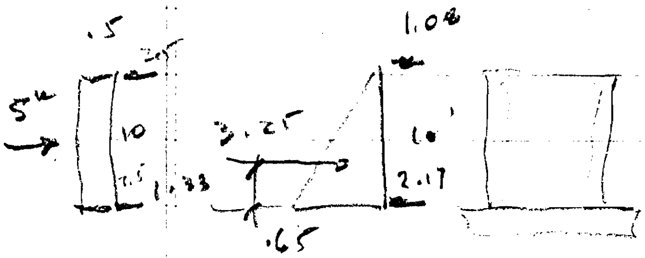
Tunnel Floor



$M = \frac{1}{8} \times 1 \times 10^2 = 12.5$ Dry

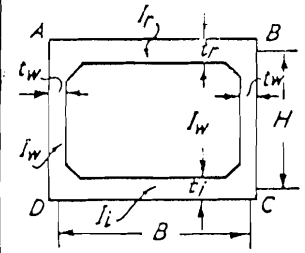
$A_s = \frac{12.5}{1.76 \times 9} = .789 \approx .8$

#8 @ 12 Total



M = 2.5 × 5 = 12.5
2.17 × 1.33 = 2.88
15.3

$A_s = \frac{15.3}{1.76 \times 9}$ .97
12" 14 11 .79
16 13 .67 #6 @ 8



I_r must be approximately equal to I_i for expressions given below to be valid:-

$$K = \frac{H}{B} \times \frac{I_c}{I_w} \simeq \frac{H}{B} \times \left(\frac{t_r}{t_w}\right)^3$$

B.M. at midspan of roof, invert or walls is obtained by deducting M_A or M_B from the B.M. when simply supported, or by proportions apparent from the diagram

LOADING	B.M. DIAGRAM	B.M. per lin. ft. of culvert (given by Reynolds 124)	
		$M_A = M_B$	$M_C = M_D$
1. w_1 lb/ft² Uniformly distributed load on roof, including weight of roof		$-\frac{w_1 B^2}{12(K+1)}$	M_A
2. W lb/ft $\frac{W}{B}$ lb/ft² Knife-edge load on roof		$-\frac{WB}{12}\left[\frac{2K+4.5}{(K+3)(K+1)}\right]$	$-\frac{WB}{24}\left[\frac{K+6}{(K+3)(K+1)}\right]$
3. w_2 lb/ft² Foundation pressure due to weight of walls – ignore if w_2 small compared with w_1		$+\frac{w_2 B^2}{12}\left[\frac{K}{(K+3)(K+1)}\right]$	$-\frac{w_2 B^2}{12}\left[\frac{3+2K}{(K+3)(K+1)}\right]$
4. p_1 lb/ft² Earth pressure on walls		$-\frac{p_1 H^2}{60}\left[\frac{K(2K+7)}{(K+3)(K+1)}\right]$	$-\frac{p_1 H^2}{60}\left[\frac{K(3K+8)}{(K+3)(K+1)}\right]$
5. p_2 lb/ft² Earth pressure on walls		$-\frac{p_2 H^2 K}{12(K+1)}$	M_A

TABLE 6.8

$L = 9'\text{-}8$

Landscape [illegible]	54.1 ×	.5
Snow		.15
Surcharge d.l.		.35
		1.00

H-20 V = 40^k

.4V = 16^k

M_L 8 × 4.33 = 34.6

M_r $\frac{1 \times 4.8^2}{8}$ = 9.7

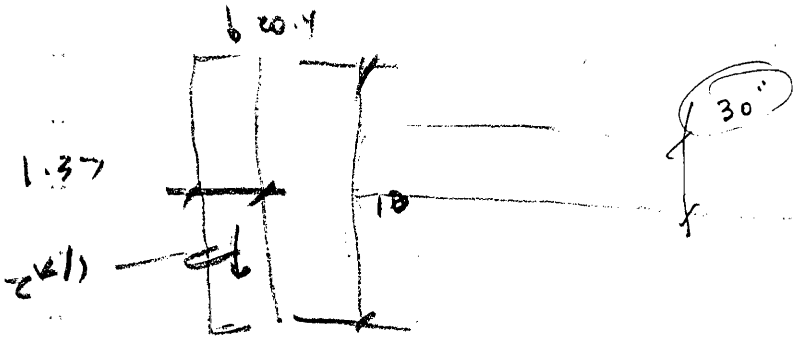
44.3

A_s = $\frac{44.3}{1.76 + 9.5}$

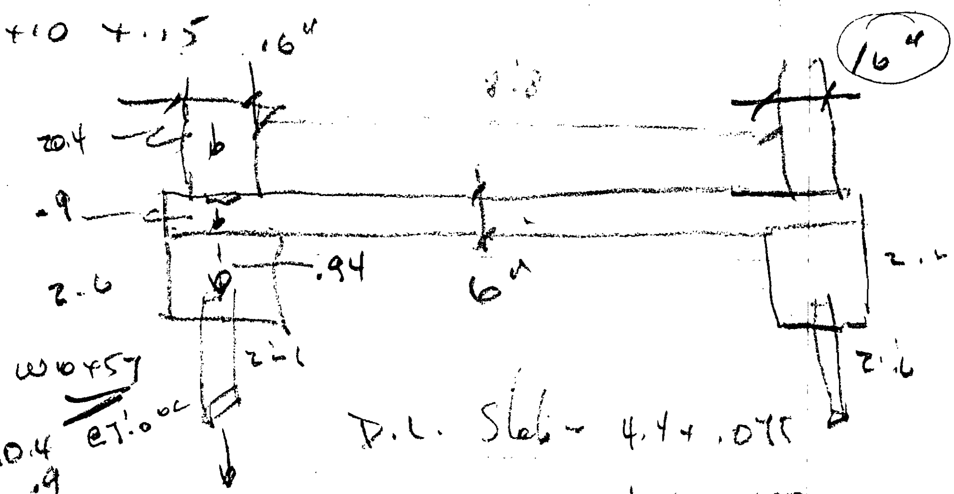
12.5
21.5
28.5 = 1.17 in²/

V_max 16 + 4.33 = 20.3

V_c = 12 + 28.5 + .06 = 20.5 Need 30" for shear 2'-6"



1.35 + 10 + .15



150^k / 22.24 = 7.0 ea.

75 Tons

20.4
.9
.94
22.24 k/1

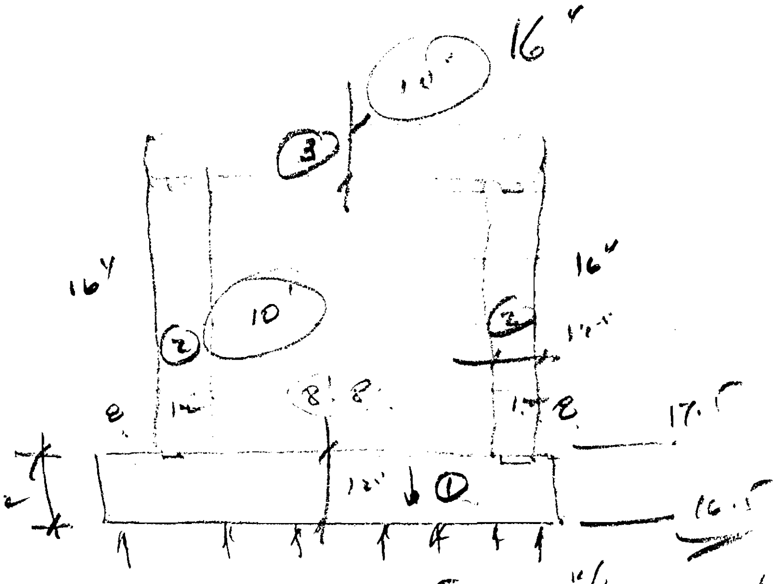
@ 7'0" oc

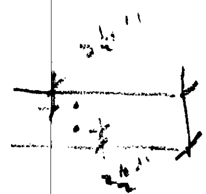
D.L. Slab = 4.4 + .075

4.4 + .100

4.4 .200 = .88 ≤ .9

(1)





d = 9½

d = 8½

24.0
17.5
6.5

1.8
1.8
8.8
12'

Hydro 6.5 × .0625 = .406 k/□' × 12 = 4.87 k/' Bouyancy ↑ 6.66 ↓

width

Loading uplift

12'

Earth 5 × .1 = .5

Slab 12" = .15

Surcharge LL = .35

1.0 k/□'

$M = \frac{1}{8} \times 1 \times 8.8^2 = 9.7^k$

$A_s = \frac{9.7}{1.76 \times 8.5} = .65$

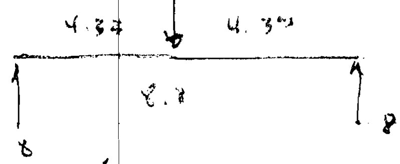
D.L. Tunnel

(1) 12 × 1 × .150 = 1.8

(2) 2 × 10 × .150 = 3.00

(3) 10.64 × .174 = 1.86

6.66 k/'



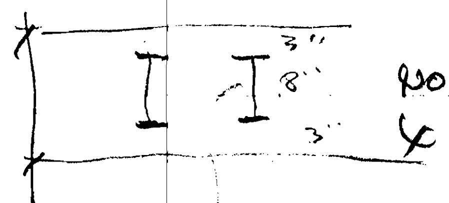
M = 8 × 4.33 = 34.6 whole tub

9.7 LL & surcharge

46.3

S = 17.6

Use W 8×31



$A_s = \frac{34.6}{1.76 \times 8.5}$

$V_c = 12 \times 11 \times .06 = 7.92^{k/1}$ (14")

$V_c = 12 \times 14 \times .06 = 10.1$ (16") over 2 = 20.2 > 20.33

4.84

20.33 k/'