

3 DORMITORY

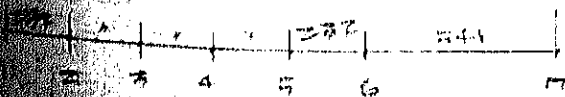
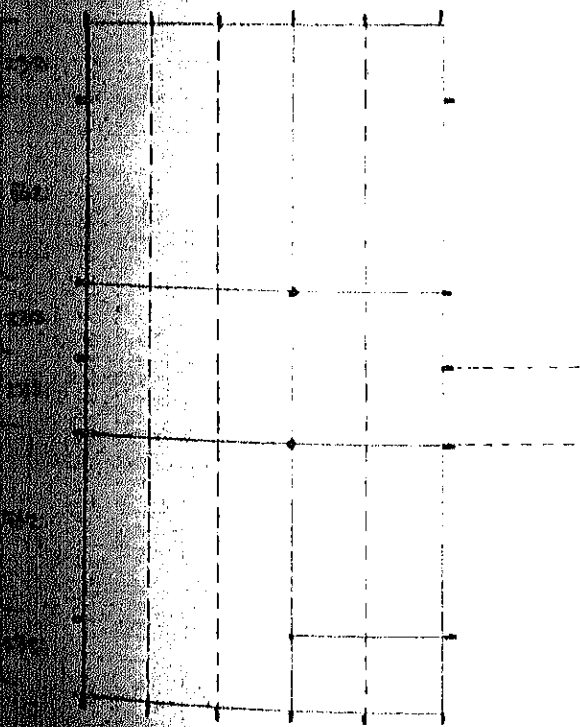
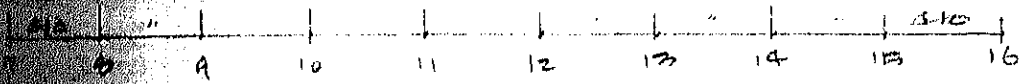
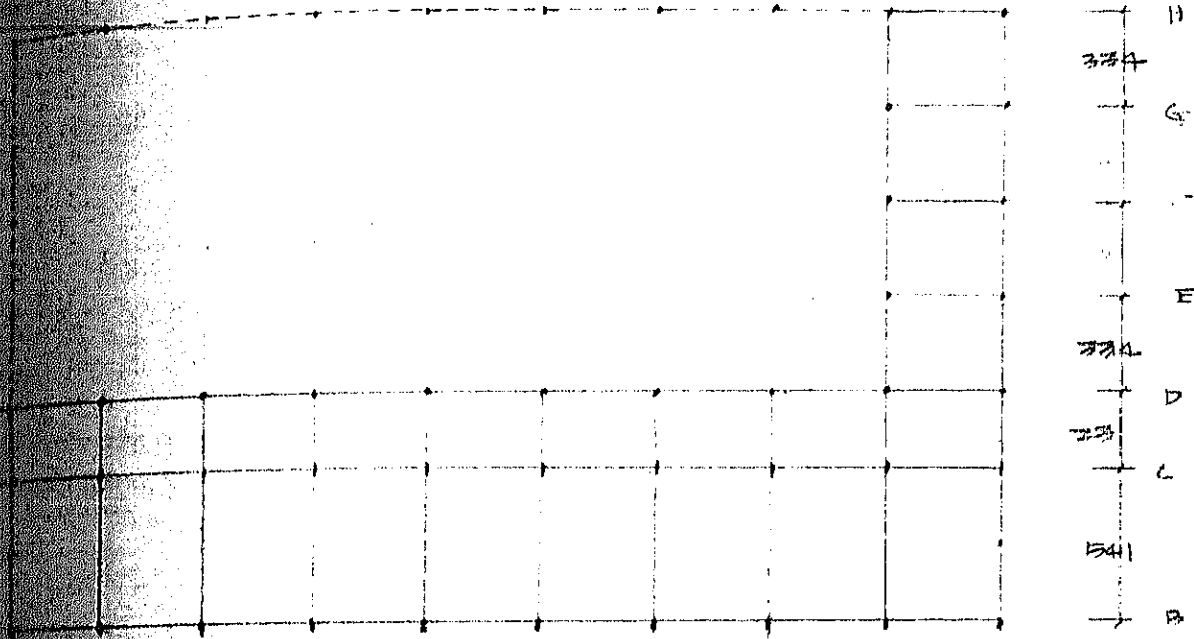
LOAD

DEAD LOAD

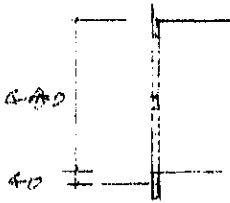
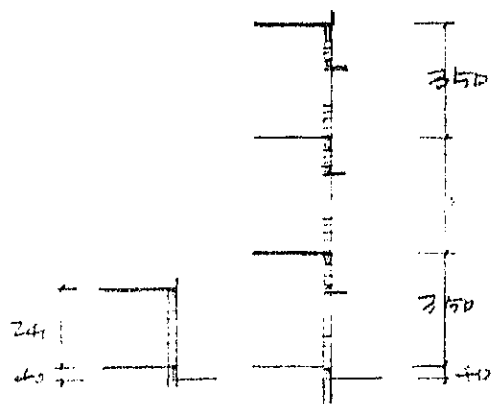
ROOF	LIKE CONCRETE	10cm	300	} 510 ^{kg/m²} (DINING ROOM 460")
	R.C. SLAB	12cm	390	
	CEILING		20	
FLOOR	TERAZZO TILE	5	100	} 410"
	R.C. SLAB	12	390	
	CEILING		20	
WALL	BRICK	25.9	490	} 540"
	CEMENT MORTAR	2.5	50	
BEAM	28x150	34.0	kg/m	
	28x175	51.0		28x90 610"
COLUMN	28x175	51.0		409 310"
	28x145	30.0		40x40 390"
	28x28	19.0		

LIVE LOAD

	SLAB	BEAM	EARTHQUAKE
ROOF	100	50	0
FLOOR	130	130	60




DINING ROOM



3.3 C, M₀, Q OF BEAM

PROB 1

Q  $l_x = 20$ $l_y = 410$ $\lambda = 15$

$C = 1.6 \times 20 + 1.40 W'$

$M_0 = 2.5 \times 20 + 2.10 W'$

$Q = 1.85 \times 20 + 2.25 W'$

(0.51)
 $W_R = 0.56$ $W_H = 0.50$

$W_E = 0.34$ $W_M = 1.61$
2.3 3.0

3.5 6.1

2.9 5.3

Q  $l_x = 20$ $\lambda = 10$

$C = 1.175 W + 1.40 W'$

$M_0 = 2.9 W + 2.10 W'$


$Q = 2.1 W + 2.05 W'$

$W_R = 0.44$ $W_H = 0.81$

1.6 2.1

2.5 3.3

2.1 2.8

Q  $l_x = 20$ $l_y = 410$ $\lambda = 17.5$
 $l_{x'} = 410$

$C = (1.45 + 1.75) W + 1.4 W'$

$M_0 = (2.3 + 2.9) W + 2.1 W'$


$Q = (1.7 + 2.1) W + 2.05 W'$

$W_R = 0.34$ $W_H = 1.96$

2.2 4.5

3.5 6.4

2.8 6.1

Q  $l_x = 20$ $l_y = 410$ $\lambda = 17.5$

$C = 1.45 W + 1.4 W'$

$M_0 = 2.3 W + 2.1 W'$

$Q = 1.7 W + 2.05 W'$

$W_R = 0.60$ $W_H = 0.89$

1.4 1.5 2.5

2.1 2.3 5.3

1.8 1.9 4.4

Q  $l_x = 20$ $l_y = 410$ $\lambda = 15$

$C = 1.6 W + 1.4 W'$

$M_0 = 2.5 W + 2.1 W'$

$Q = 1.85 W + 2.05 W'$

1.5 2.0

2.3 3.1

1.9 2.7

Q  $l_x = 20$ $l_y = 410$ $\lambda = 17.5$

$C = (1.45 + 1.6) W + 1.4 W'$

$M_0 = (2.3 + 2.9) W + 2.1 W'$

$Q = (1.7 + 1.85) W + 2.05 W'$

2.1 4.4

3.3 6.5

2.6 5.9



$l_x = 4.1$ $l_y = 2.6$ $\gamma = 1.32$

$w'_x = 0.61$ $w'_y = 1.74$

$C = 4.1 \times 2.6 + 2.32 w'$

5.9 3.9

$I_x = 6.3 \times 2.6 + 2.32 w'$

9.7 13.3

$I_y = 3.5 \times 2.6 + 2.32 w'$

5.7 4.6



$l_x = 2.32$

$w'_x = 0.39$

$C = 0.33 \times 2.6 + 0.46 w'$

0.5 0.5

$I_x = 0.46 \times 2.6 + 0.64 w'$

0.7 0.7

$I_y = 0.64 \times 2.6 + 1.16 w'$

1.1 1.1



$l_x = 4.1$ $l_y = 4.3$ $\gamma = 1.32$

$w'_x = 0.51$ $w'_y = 1.78$

$l_x = 2.70$ $l_y = 4.1$ $\gamma = 1.5$

$C = (4.1 + 4.3) w' + 2.64 w'$

5.9 3.9

$I_x = (6.3 + 7.6) w' + 3.60 w'$

9.7 14.0

$I_y = (3.5 + 3.7) w' + 2.71 w'$

5.4 3.7



$l_x = 2.6$

$w'_x = 0.44$ $w'_y = 1.96$

$C = 0.5 w' + 0.61 w'$

0.6 1.5

$I_x = 0.46 w' + 0.41 w'$

0.4 2.2

$I_y = 0.46 w' + 1.32 w'$

1.1 3.2



$l_x = 2.6$

$w'_x = 0.4$ $w'_y = 0.44$

$C = 0.33 w' + 0.46 w'$

0.4 0.4 1.2

$I_x = 0.46 w' + 0.41 w'$

0.4 0.6 1.4

$I_y = 0.46 w' + 1.16 w'$

0.4 0.4 2.1

LAUNDRY



$l_x = 2.20$ $l_y = 2.10$ $\gamma = 1.33$

$w'_x = 0.34$

$C = 1.1 \times 2.1 + 2.05 w'$

2.5

$I_x = 2.05 \times 2.1 + 2.1 w'$

2.9

$I_y = 2.1 \times 2.1 + 2.05 w'$

3.1



$l_x = 2.24$

$\lambda = 1.5$

$w' = 0.24$

$C = 0.915 W + 0.62 W'$

0.9

$I_{yy} = 1.15 W + 1.24 W'$

1.2

$Q = 1.4 W + 1.6 W'$

1.4

SHINA ROOM



$l_x = 2.22$

$l_y = 1.94$

$\lambda = 2.42$

$w' = 0.51$

$C = 6.0 \times 2 W + 5.25 W'$

6.0

$I_{yy} = 9.5 \times 2 W + 7.4 W'$

7.4

$Q = 4.2 \times 2 W + 3.2 W'$

6.7



$l_x = 2.22$

$l_y = 1.64$

$\lambda = 2.0$

$w' = 0.51$

$C = 1.05 \times 2 W + 1.79 W'$

2.8

$I_{yy} = 2.9 \times 2 W + 2.69 W'$

4.7

$Q = 2.0 \times 2 W + 2.22 W'$

3.2



$l_x = 2.22$

$l_y = 1.62$

$\lambda = 2.42$

$w' = 0.51$

$C = 2.9 \times 2 W + 3.67 W'$

4.3

$I_{yy} = 4.6 \times 2 W + 3.95 W'$

6.7

$Q = 2.7 \times 2 W + 2.71 W'$

6.2



$l_x = 2.22$

$\lambda = 1.00$

$w' = 0.34$

$C = 0.32 \times 2 W + 0.45 W'$

0.6

$I_{yy} = 0.53 \times 2 W + 0.67 W'$

0.9

$Q = 0.7 \times 2 W + 1.16 W'$

1.3



$l_x = 2.22$

$\lambda = 1.00$

$w' = 0.44$

$C = 0.32 \times 2 W + 0.6 W'$

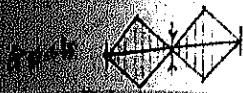
0.4

$I_{yy} = 0.53 \times 2 W + 0.67 W'$

0.6

$Q = 0.7 \times 2 W + 1.16 W'$

0.9



$l = 464$

$P = 42 + 113 = 155$

$w' = 0.51$

$C = 221 W + 5.5 \times 464 / 2 + 179 W' \quad 5.2$

$P_C = 212 W + \dots / 2 + 364 W' \quad 9.4$

$Q = 269 W + 2.5 / 2 + 221 W' \quad 2.3$



$l = 696$

$P = 62 + 37 = 99$

$w' = 0.61$

$C = 421 W + 9.5 \times 696 \times 2 / 4 + 414 W' \quad 14.0$

$P_C = 421 W + 9.5 \times 2 \times 696 \times 2 / 4 + 603 W' \quad 29.5$

$Q = 404 W + 4.75 + 301 W' \quad 12.7$



$l = 264$

$P = 22 + 42 = 64$

$w' = 0.61$

$P = 9.5$

$C = 221 W + 5.5 \times 264 / 2 + 179 W' \quad 6.5$

2.7

$P_C = 212 W + \dots / 2 + 364 W' \quad 11.4$

14.3

$Q = 269 W + 2.5 / 2 + 221 W' \quad 5.2$

7.5



$l_x = 222$

$l_y = 562$

$\lambda = 212$

$w' = 0.44$

$C = 219 W + 267 W' \quad 2.6$

$P_C = 66 W + 346 W' \quad 4.1$

$Q = 215 W + 241 W' \quad 2.6$

$l_x = 222$

$w' = 0.6$

$C = 0.45 W' \quad 0.6$

$P_C = 0.65 W' \quad 0.9$

$Q = 1.16 W' \quad 1.6$

$l = 562$

$w' = 1.26$

$C = 2.67 W' \quad 2.3$

$P_C = 2.95 W' \quad 5.0$

$Q = 3.91 W' \quad 2.5$

AXIAL FORCE OF COLUMN

ROOF & FLOOR	WALL	BEAM	COLUMN	W	P
0.10 x 4.1	0.41				
0.64 x 3.82	2.49	2.61	1.03	12.71	12.43
1.27 x 2.56	3.25				
1.11 x 3.42	4.26	2.61	1.79	17.89	30.7
1.27 x 2.56	3.25				
1.11 x 3.32	4.24	2.61	2.66	19.73	49.6
0.10 x 3.2	0.34				
0.64 x 1.91	1.22	1.06	1.09	5.26	5.3
1.27 x 1.21	1.54				
1.11 x 1.91	2.12	1.06	1.79	8.00	13.3
1.27 x 1.21	1.54				
1.11 x 1.91	2.12	1.06	2.66	8.99	22.2
0.10 x 2.7	0.27				
0.64 x 1.21	0.77	1.47	0.40	6.02	6.0
1.27 x 3.11	3.94				
1.11 x 1.21	1.34	1.47	0.66	10.41	16.4
1.27 x 3.11	3.94				
1.11 x 1.21	1.34	1.47	0.99	10.75	27.2
0.10 x 4.1 x 3.87	0.41	2.93	0.53	22.71	22.8
1.64 x 3.82	6.26				
1.27 x 2.56	3.25	2.93	1.05	22.06	44.8
1.64 x 3.82	6.26				
1.27 x 2.56	3.25	2.93	1.58	22.64	67.4
0.10 x 3.6	0.25				
0.64 x 1.21	0.77	1.38	0.40	5.69	5.17
1.64 x 4.3	7.05				
1.11 x 1.21	1.34	1.38	0.66	13.45	19.15
1.64 x 4.3	7.05				
1.11 x 1.21	1.34	1.38	0.99	14.18	33.7
0.10 x 4.1	0.41				
0.15 x 3.42	0.51	1.62	0.40	4.86	4.9
0.15 x 3.42	0.51				
0.15 x 3.42	0.51	1.62	0.66	5.19	10.0
0.15 x 3.42	0.51				
0.15 x 3.42	0.51	1.62	0.99	5.51	15.6
0.10 x 3.7	0.37				
0.15 x 2.56 x 1.67	1.92	0.52		2.44	18.0
0.10 x 2.05 x 1.16	1.21	0.97	0.40	2.95	3.0
1.64 x 1.91	3.13	0.97	0.66	6.67	0.6
1.64 x 1.91	3.13				
1.64 x 1.91	3.13	0.97	0.99	7.00	16.6
0.15 x 2.05 x 1.16	1.92	2.52		3.44	19.1

ROOF		WALL		BEAM	COLUMN	W	P
0.56 x 2.15 x 2.24	3.63			1.72	0.53		6.1
				1.30	0.53		1.9
0.41 x 1.16 x 1.16	0.69	0.10 x 2.23 1.20 x 2.04	0.23 2.79	0.60	2.65		7.1
0.41 x 2.22 x 3.97	4.70	0.10 x 2.23 1.20 x 2.24	0.23 2.79	2.64	2.65		13.0
0.41 x 2.22 x 1.16	1.37	0.10 x 2.23 1.20 x 2.04	0.23 2.79	1.07	2.65		8.1
0.41 x 1.16 x 3.97	2.35	0.10 x 2.23 1.20 x 2.24	0.23 2.79	1.26	2.65		11.7
0.41 x 3.43 x 3.97	7.05	1.21 x 3.63 0.10 x 2.23	7.11 0.23	2.91	0.90		140.0
0.41 x 2.22 x 3.97	4.70	1.21 x 2.48 1.20 x 2.04 0.10 x 2.23	2.64 5.06 0.23	2.26	2.65		17.0
0.41 x (3.43 x 6.29 - 5.45) 0.13	0.13	0.10 x 2.23 1.20 x 2.24	0.23 2.79	4.40	2.65		20.0
2.22 x 5.13	6.07						
0.41 x 3.43 x 6.29	11.16	1.21 x 4.26	5.07	10.14	2.03		35.3
1.16 x 2.17	1.60	0.10 x 4.10	0.40				
0.41 x (2.22 x 5.13 - 2.64)	4.70	1.20 x 2.24	5.06	4.74	2.65		14.2
0.41 x 1.16 x 2.22	1.37	0.10 x 2.23 1.20 x 2.04	0.23 2.79	2.64	2.65		7.7
1.16 x 2.17	1.60	0.10 x 2.23	0.23				
0.41 x 1.16 x 2.22	1.37	1.20 x 2.04	2.79	1.61	2.65		10.3
0.41 x 5.13 x 6.29	16.61			11.04	1.61		31.3

SEISMIC FORCE

CONTOUR

ROOF	$0.51 \times 369 \times 17.73$	145.5	
PARAPET	$0.10 \times 369 \times 2$	8.9	
WALL	$0.64 \times (2.42 \times 9 + 2.43)$	27.6	
	$0.54 \times 1.5 \times 36.5$	29.6	
	$0.46 \times 1.34 \times 41.0$	26.0	
BEAM	0.24×121.8	41.4	
	0.51×51.3	26.2	
COLUMN	$0.51 \times 2.15 \times 10$	11.0	
	$0.30 \times 1.76 \times 10$	5.3	
	$0.14 \times 2.15 \times 10$	4.1	321.6

2ND FLOOR	$0.47 \times (369 \times 17.73 + 2.18)$	135.1	
WALL	$0.77 \times (2.42 \times 9 + 2.43)$	28.3	
	$0.54 \times 2.0 \times 36.5$	39.1	
	$0.46 \times 2.175 \times 41.0$	51.9	
BEAM		67.6	
COLUMN	$0.51 \times 2.15 \times 10$	17.9	
	$0.30 \times 2.15 \times 10$	10.5	
	$0.14 \times 2.15 \times 10$	6.7	307.1

1ST FLOOR		307.1	
ROOF	$0.51 \times (2.0 \times 369 + 4.1 \times 167)$	6.7	
BEAM	0.24×2	2.4	306.6

	W	L	B	Q
3	321.6	0.1	32.2	32.2
2	307.1	"	37.7	69.9
1	306.6	"	38.7	108.6

LAUNDRY

ROOF	$0.51 \times 4.1 \times 12.02$	25.1	
WALL	$0.15 \times 1.15 \times 13.7$	2.5	
	$0.15 \times 1.15 \times 14.7$	3.2	
BEAM	0.36×35.7	12.8	
COLUMN	$0.14 \times 1.4 \times 8$	3.1	$51.0 \times 0.1 = 5.1$

DINING

ROOF	$0.46 \times 11.6 \times 20.52$	109.5	
	$0.46 \times 2.7 \times 2.22$	2.4	
WALL	1.30×4.74	6.4	
	1.21×1.81	3.1	
	0.10×6.42	0.6	
BEAM	0.36×6.45	2.4	
	0.51×2.61	3.1	
	0.61×21.43	13.3	
COLUMN	$0.51 \times 2.6 \times 2.2$	2.9	
	$0.31 \times 2.6 \times 1$	0.8	
	$0.36 \times 2.6 \times 1$	1.0	
	$0.1 \times 2.6 \times 1$	0.5	
			$111.1 \times 0.1 = 11.1$

FENCE

WALL	$0.15 \times 1.4 \times 2.22$	0.8	
BEAM	0.36×2.22	1.3	
COLUMN	0.14×1.4	0.3	$2.4 \times 0.1 = 0.2$

WIND PRESSURE

$$q = 60 \sqrt{2.0} = 93 \text{ lb/ft}^2$$

$$w = 93 \times 2.0 \times 0.5 = 93$$

$$D = 93 \times 4.1 \times 2.3 = 1060 \text{ lb} = 1.1 \text{ T}$$

3-6 STIFFNESS RATIO

	b x d	J ₁	l	K ₁₀	$\frac{K_{10}}{J_1}$	$\frac{K_{10}}{J_1}$
2C	28 x 175	984	350	28.1		2.81
	75 x 28	1317		3.9		0.39
	28 x 45	21.3		6.1		0.61
	45 x 28	8.2		2.3		0.23
	28 x 28	5.1		1.5		0.15
1C	28 x 175	984	390	25.2		2.52
	75 x 28	1317		3.5		0.35
	28 x 45	21.3		5.5		0.55
	45 x 28	8.2		2.1		0.21
	28 x 28	5.1		1.3		0.13
4C	28 x 175	29.2	410	7.1	1.46	1.04
			370	12.6	1.75	1.24
			270	16.8	1.30	1.60
					1.49	1.87
					1.25	1.45
5C	28 x 175	984	541	18.2	1.60	2.17
					1.78	
	35 x 90	212.6	410	51.9		51.9
			232	91.6		91.6
			270	73.5		73.5
6C			541	39.3		39.3
	28 x 175	5.1	380	1.8		1.8
	28 x 175	29.2	334	8.7	1.35	1.17
	35 x 175	122.0	410	30.0		30.0
			370	36.8		36.8

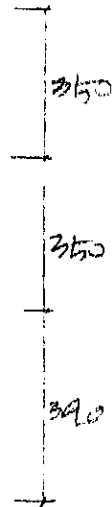
1×10^3

	b x d	J ₁₀₄	l	K ₁₀₂	φ	R _e
C	28 x 175	984	520	1.89		1.89
	75 x 28	17.7		2.6		2.36
	28 x 28	5.1		1.0		0.10
	40 x 40	21.3		4.1		0.81
	40 φ	12.5		2.4		0.34
G	28 x 50	29.2	232	12.6	1.303 1.175	2.28
			562	5.2	1.56	0.81
	28 x 175	984	464	21.2	16.28	3.45
			794	12.4	1.95	2.41
	28 x 90	170.1	696	24.4	1.86	4.51
FG	35 x 90	212.6	232	9.16		9.16
			464	4.58		4.58
			562	3.78		3.08
			696	3.05		3.05
			794	2.68		2.68

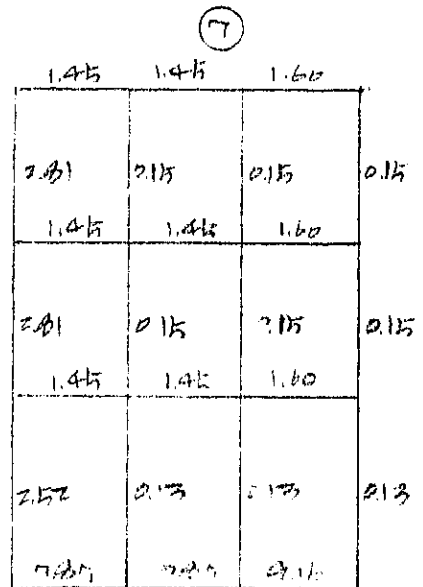
K₀ = 10³

1.67

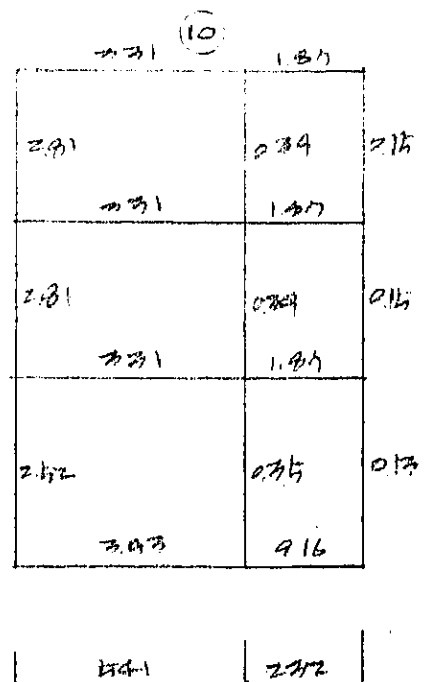
	1.04	1.04	1.04	1.04	1.04
0.15	0.15	0.15	0.15	0.15	0.15
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0.15	0.15	0.15	0.15	0.15	
1.04	1.04	1.04	1.04	1.04	
0.13	0.13	0.13	0.13	0.13	
5.14	5.14	5.14	5.14	5.14	

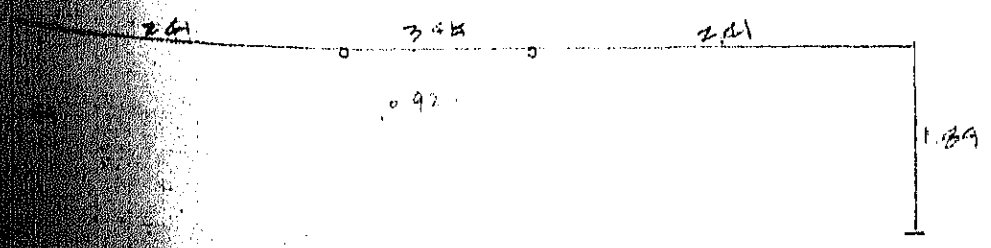
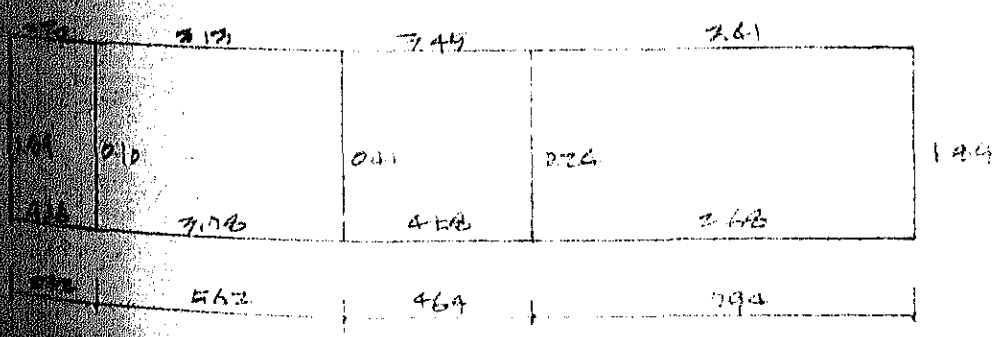
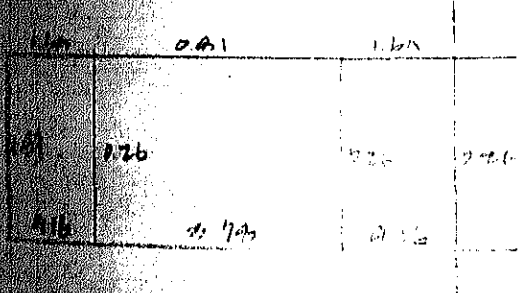
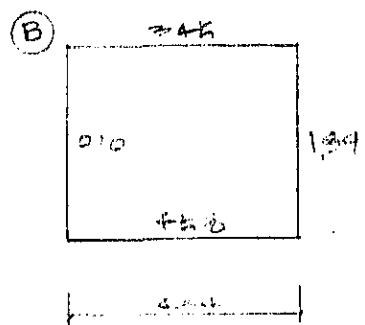
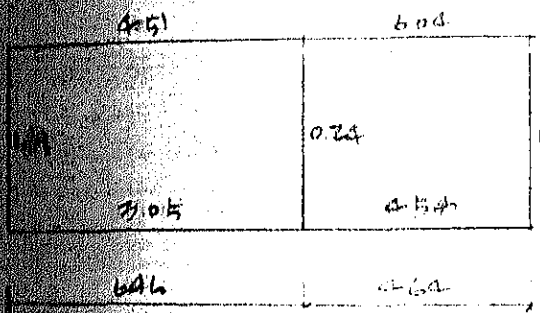
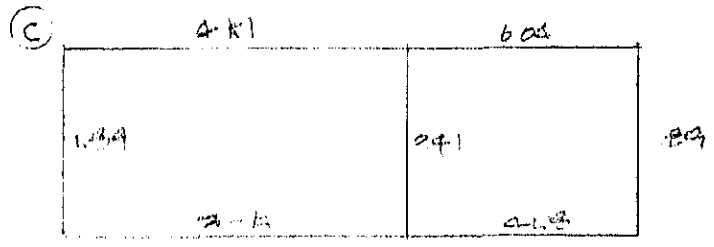
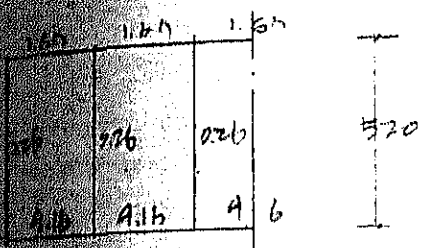
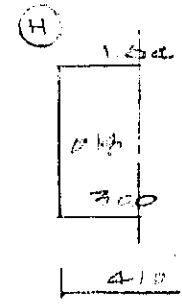
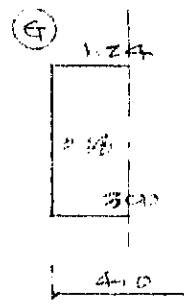
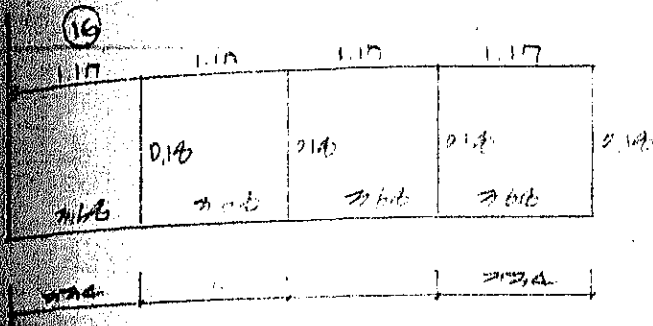


	1.24	1.24	1.24	1.24
0.23	0.23	0.23	0.23	0.23
1.24	1.24	1.24	1.24	
0.23	0.23	0.23	0.23	
1.24	1.24	1.24	1.24	
0.21	0.21	0.21	0.21	
5.14	5.14	5.14	5.14	



	1.04	1.06	1.04	1.04
0.39	0.39	0.39	0.39	0.39
1.04	1.04	1.06	1.04	1.04
0.39	0.39	0.39	0.39	0.39
1.04	1.04	1.04	1.04	1.04
0.35	0.35	0.35	0.35	
5.14	5.14	5.14	5.14	





CALCULATION OF STRESS

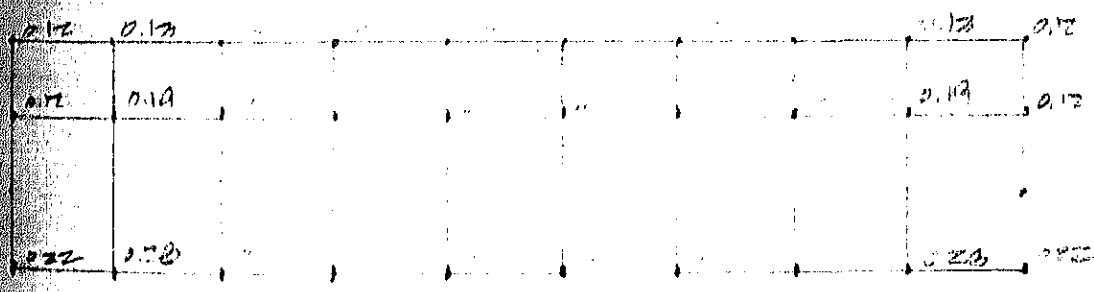
107

107	17.07	9.27	10.73	2.67	5.33
0.12	0.13	0.12	0.19	0.22	0.28
0.6	0.7	0.6	1.0	1.2	1.5
0.44	0.45	0.45	0.55	0.63	0.65
107	17.07	9.27	10.73	2.67	5.33
0.12	0.13	0.12	0.19	0.22	0.28
1.4	1.5	1.4	2.2	2.6	3.3
0.60	0.60	0.60	0.60	0.40	0.50
100	10.00	9.53	11.47	2.97	5.94
0.11	0.12	0.11	0.19	0.24	0.28
2.1	2.3	2.1	3.7	4.6	5.9
0.45	0.55	0.44	0.55	0.55	0.55

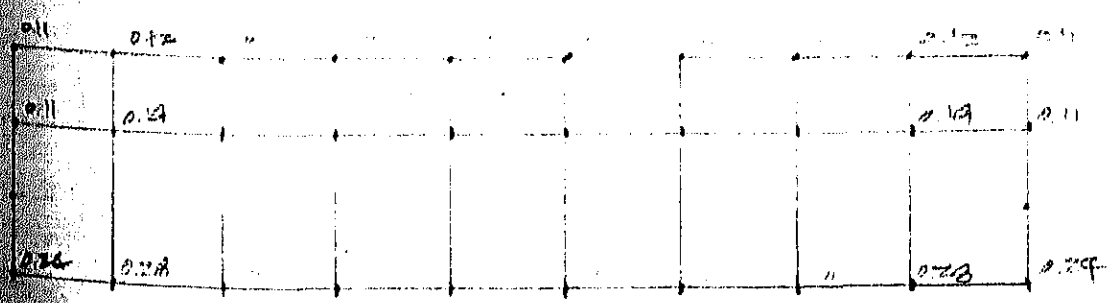
ΣQ
27.12

699

1036



$\Sigma Q = 1036$



$\Sigma D = 5.64$

19.33	20.33	10.60	11.8	12.26	12.47
0.14	0.14	0.13	1.04	0.34	0.13
0.3	0.3	0.3	3.4	0.8	0.3
0.65	0.65	0.65	0.36	0.65	0.65
19.33	20.33	10.60	11.8	12.26	12.47
0.14	0.14	0.13	1.04	0.34	0.13
0.7	0.7	0.6	5.2	1.07	0.6
0.50	0.50	0.50	0.45	0.50	0.50
22.31	23.6	12.71	1.31	1.40	1.47
0.12	0.12	0.12	1.30	0.32	0.12
0.7	0.7	0.7	3.6	2.0	0.7
0.55	0.55	0.55	0.56	0.55	0.55

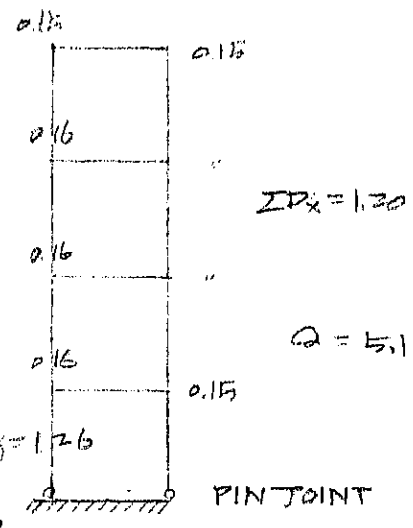
0.13	"	"	"	"	"	"	0.13	0.13
0.14	"	"	"	"	"	"	0.14	0.14
1.04	"	"	"	"	"	"	1.04	0.50

ΣD = 14.06

0.12	"	"	"	"	"	"	0.12	0.12
0.32	"	"	"	"	"	"	0.32	0.12
1.30	"	"	"	"	"	"	1.30	0.12

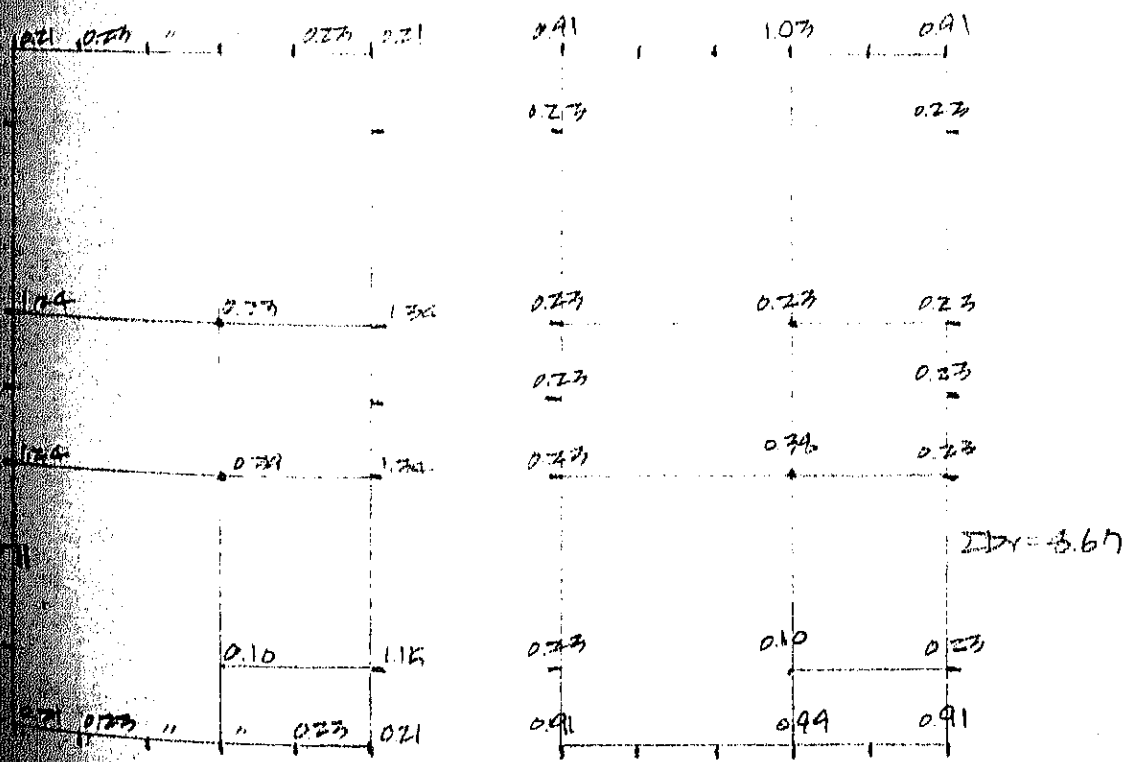
ΣD = 17.33

112.7	13.0	6.40	6.40	5.10
0.16	0.16	0.15	0.15	0.15
0.6	0.6	0.6	0.6	0.6
0.55	0.55	0.55	0.55	0.55



12.44	2.5	1.43	2.39	5.73	3.20	4.31
0.21	0.10	1.15	1.24	0.79	1.34	0.23
0.3	3.7	4.0	1.2	4.3	0.7	
0.55	0.55	0.55	0.55	0.55	0.55	

1.6	5.73	16.05	24.42	1.26	0.39
0.99	0.10	0.38	0.23	1.03	0.23
3.6	0.4	1.4	0.8	3.7	0.7
0.55	0.55	0.55	0.55	0.55	0



PROG. DIAGRAM OF SEISMIC FORCE

⑥

11	0.17	0.15	0.10	0.07
12	0.17	0	0	0
13	0.17	1.13	0.7	1.3
14	1.9	1.1	1.1	1.1
15	1.9	1.4	0.9	1.2
16	1.9	1.4	1.2	1.2
17	0	0	0	0
18	1.5	2.6	1.5	2.6
19	1.5	2.6	2.6	1.6
20	1.5	2.6	2.6	2.6
21	0	0	0	0
22	4.0	4.0	4.0	4.0
23	4.0	4.0	4.0	4.0
24	1.2	1.2	1.2	1.2
25	1.2	1.2	1.2	1.2
26	0	0	0	0

⑦

11	1.0	1.0	1.0	1.0
12	0	0	0	0
13	1.0	1.0	1.0	1.0
14	1.6	1.6	1.6	1.6
15	1.6	1.6	1.6	1.6
16	1.6	1.6	1.6	1.6
17	0	0	0	0
18	3.9	3.9	3.9	3.9
19	3.9	3.9	3.9	3.9
20	3.9	3.9	3.9	3.9
21	0	0	0	0
22	6.5	6.5	6.5	6.5
23	6.5	6.5	6.5	6.5
24	3.0	3.0	3.0	3.0
25	3.0	3.0	3.0	3.0
26	0	0	0	0

⑧

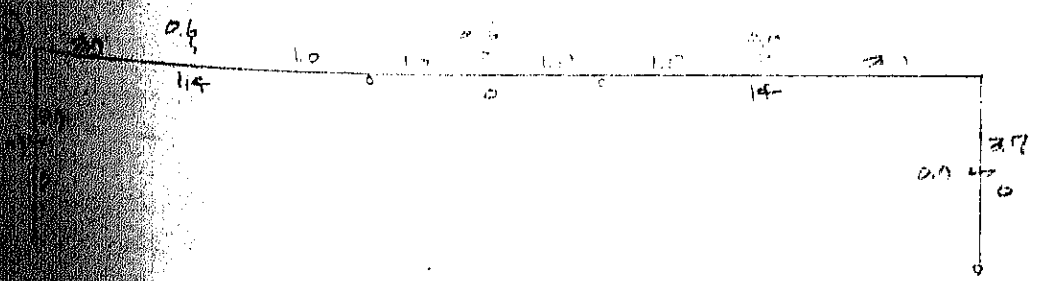
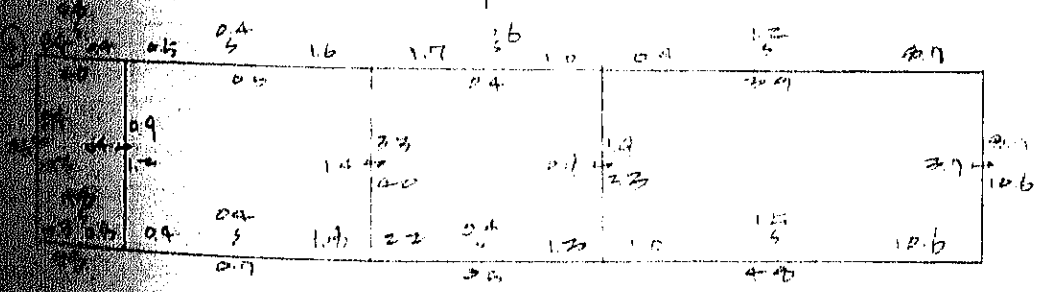
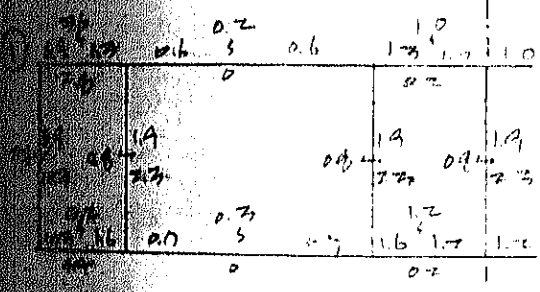
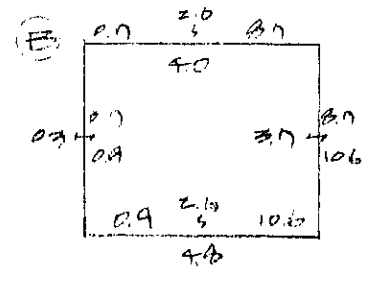
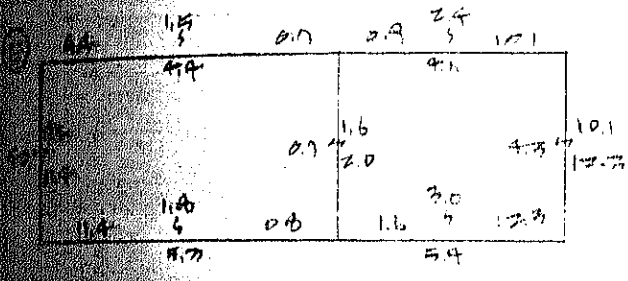
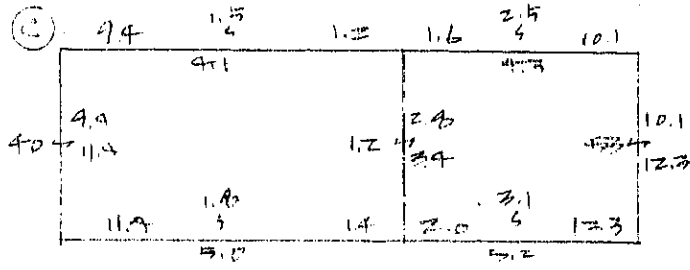
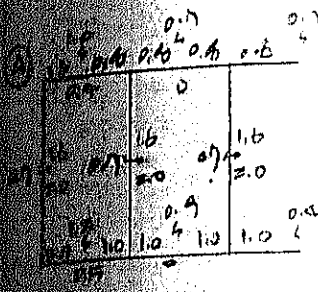
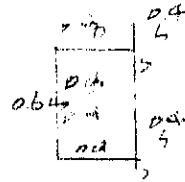
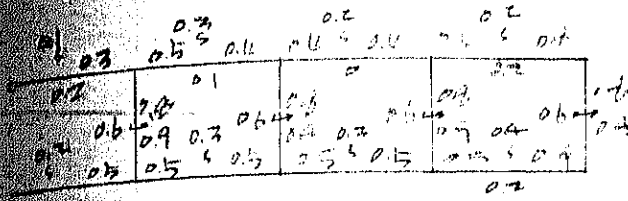
11	1.5	1.5	1.5	1.5
12	0	0	0	0
13	2.9	1.5	2.9	2.0
14	2.9	2.0	2.9	2.0
15	2.9	2.0	2.9	2.0
16	0	0	0	0
17	5.8	5.8	5.8	5.8
18	5.8	5.8	5.8	5.8
19	5.8	5.8	5.8	5.8
20	0	0	0	0
21	9.5	9.5	9.5	9.5
22	11.6	11.6	11.6	11.6
23	2.0	2.0	2.0	2.0
24	2.0	2.0	2.0	2.0
25	0	0	0	0

⑨

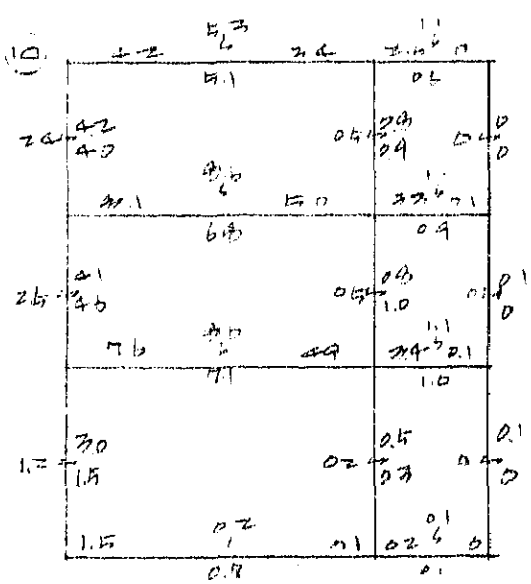
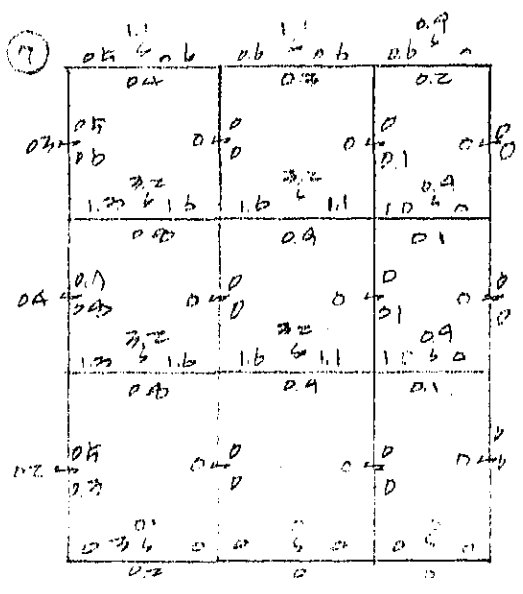
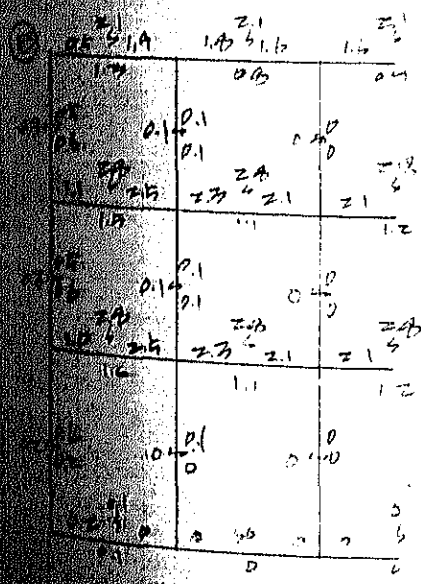
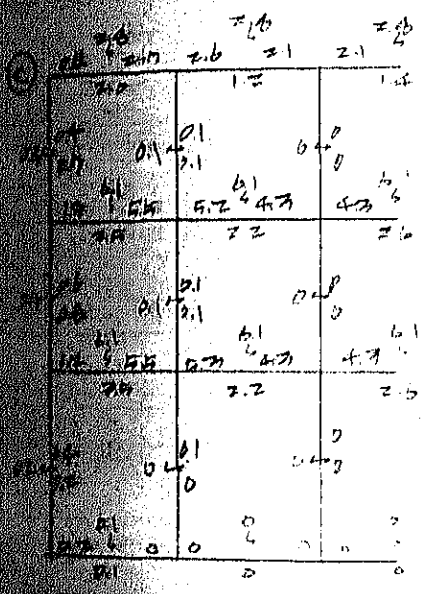
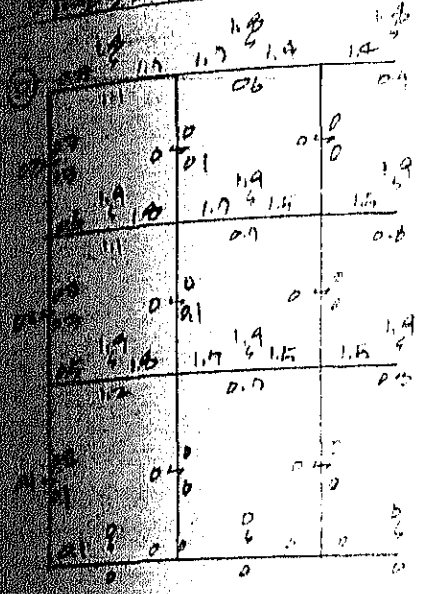
11	1.5	1.0	0.2	0.2
12	0	0	0	0
13	1.4	0.2	0.6	0.6
14	1.4	0.2	0.6	0.6
15	1.4	0.2	0.6	0.6
16	0	0	0	0
17	5.6	1.2	1.2	1.1
18	5.6	1.2	1.2	1.1
19	5.6	1.2	1.2	1.1
20	0	0	0	0
21	12.3	1.2	1.2	1.1
22	12.3	1.2	1.2	1.1
23	12.3	1.2	1.2	1.1
24	0	0	0	0
25	1.2	1.2	1.2	1.2
26	1.2	1.2	1.2	1.2

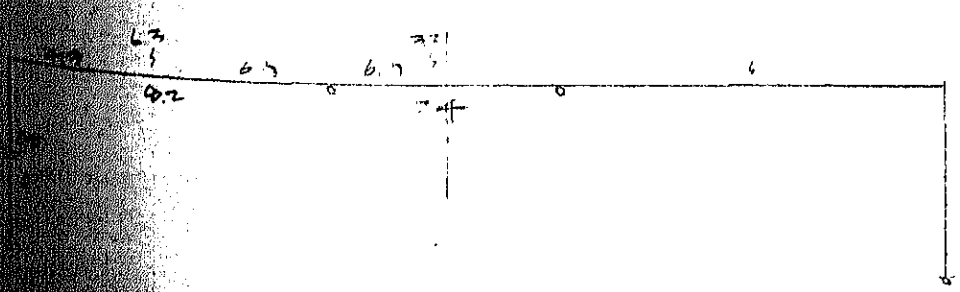
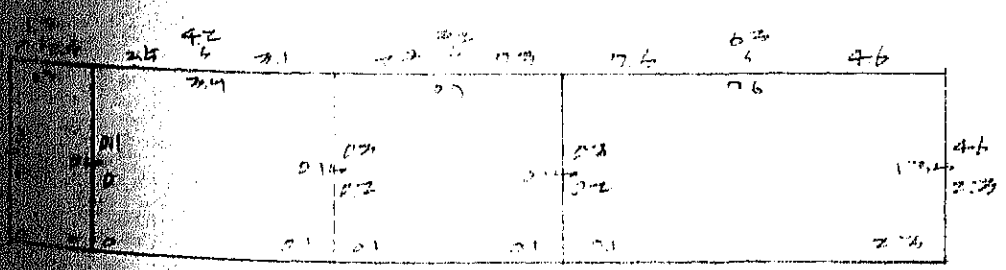
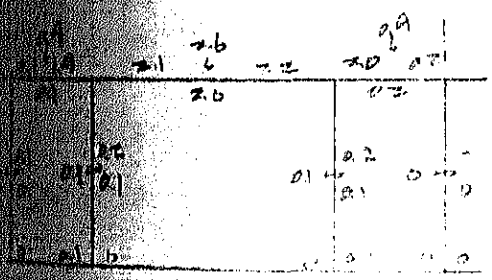
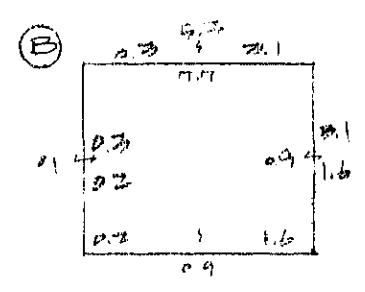
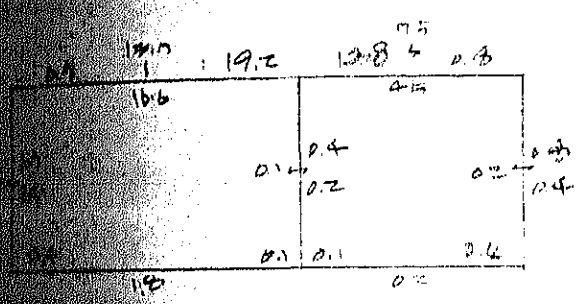
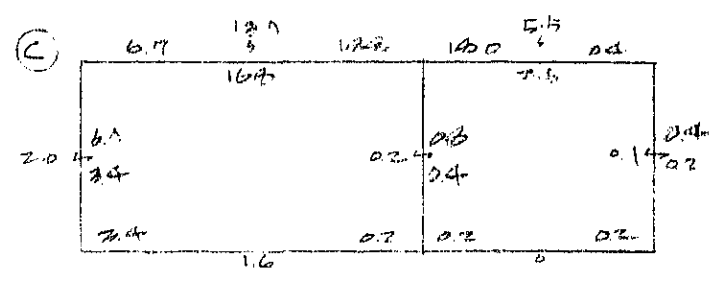
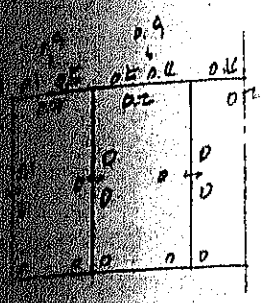
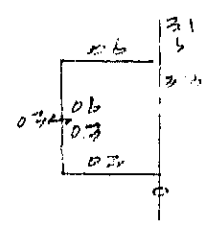
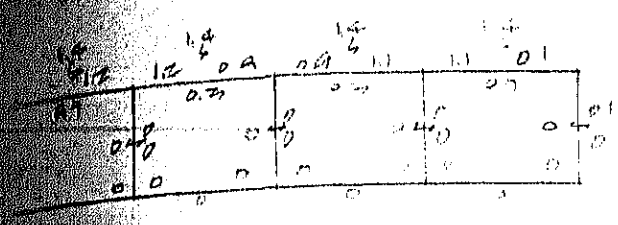
⑩

11	1.2	1.0	0.6	0.6
12	0	0	0	0
13	5.4	1.5	1.5	1.5
14	5.4	1.5	1.5	1.5
15	5.4	1.5	1.5	1.5
16	0	0	0	0
17	10.0	3.0	3.0	1.1
18	10.0	3.0	3.0	1.1
19	10.0	3.0	3.0	1.1
20	0	0	0	0
21	14.1	3.6	3.6	1.2
22	14.1	3.6	3.6	1.2
23	14.1	3.6	3.6	1.2
24	0	0	0	0
25	9.1	9.1	9.1	9.1
26	9.1	9.1	9.1	9.1



STRESS DIAGRAM OF VERTICAL LOAD





DESIGN OF SECTION 4

BAR

Bar	μ_{OE}	μ_c	μ_{IE}	α	μ_E	μ_c	α
L	0.5	1.3	1.9	2.1	1.8	0.9	2.1
E	2.4	0.5	1.5	1.0	1.5	0	0.7
S	2.9		3.4	4.1	3.3		3.5

$b \times D = 2 \phi \times 150$

A	2.4	1.7	2.4		2.4	1.1	
M	2-D16	2-D16	2-D16		2-D16	2-D16	

Bar	μ_{OE}	μ_c	μ_{IE}	α	μ_E	μ_c	α
L	1.1	1.5	2.5	2.4	2.3	1.2	2.8
E	0.5	1.2	4.1	2.6	4.1	0	2.0
S	7.6	2.7	6.6	4.0	6.4		6.8

$b \times D = 2 \phi \times 150$

A	6.4	3.3	5.6		5.4	1.5	
M	4-D16	2-D16	4-D16		4-D16	2-D16	

Bar	μ_{OE}	μ_c	μ_{IE}	α	μ_E	μ_c	α
L	4.0	1.6	2.5	2.8	2.3	1.2	2.8
E	12.5	2.4	7.7	4.9	7.7	0	3.8
S	13.5	4.0	10.2	12.6	10.0		10.4

$b \times D = 2 \phi \times 150$

A	11.4	3.4	9.5		8.5	1.5	
M	2-D19	2-D19	4-D19		4-D19	2-D19	

$\Delta Q = 12.6 - 9.9 = 2.7$

$\Delta Q / b D = 2.7 / 20 = 0.135$

$\Delta Q / b D = 2.7 / 20 = 0.135 \rightarrow 100$

$\Delta Q = 10.5 - 9.9 = 0.6$

$\Delta Q / b D = 0.45 \rightarrow 100$

$\Delta Q / b D = 2.2 \rightarrow 15$

Section	μ_{OE}	μ_C	μ_{FE}	σ	μ_E	μ_C	σ
L	0.4	26	27	23	26	14	23
E	1.1	0.1	1.0	0.5	1.0	0	0.5
S	1.5						

$b < D = 23 \times 150$

a	1.3	2.5	2.4		2.3	1.8	
m	2-D16	2-D16	2-D16		2-D16	2-D16	

Section	μ_{OE}	μ_C	μ_{FE}	σ	μ_E	μ_C	σ
L	1.3	3.5	5.5	6.1	5.2	2.6	6.1
E	3.4	0.3	3.3	1.5	2.6	0	1.5
S	4.1		2.3	4.1	2.0		2.9

$b < D = 2.9 \times 150$

a	4.0	4.5	7.0		6.8	2.3	
m	4-D11	5-D11	4-D16		4-D16	2-D16	

Section	μ_{OE}	μ_C	μ_{FE}	σ	μ_E	μ_C	σ
L	1.2	3.2	4.5	6.1	4.3	2.6	6.1
E	6.2	0.5	5.2	2.3	5.2	0	2.3
S	7.4		10.5	11.7	10.5		11.7

$b < D = 3.9 \times 150$

a	6.3	4.5	9.1		8.9	3.3	
m	4-D19	3-D19	4-D19		4-D19	3-D19	

$\Delta D = 11.7 - 9.0 = 1.7$

$\Delta D / \mu_E = 1.7 / 5.2 = 0.33$

$b < D = 14.3 / 0.9 \times 0.74 = 16.5 \rightarrow 15 \text{ (R)}$

1000-1100	170E	170	175E	Q	175	170	Q
L	0.3	1.1	1.7	1.8	1.7	0.0	1.3
E	1.1	0.2	0.7	0.5	0.0	0	0.3
D	1.4						
b=0.0 = 2.7 = 0.0							
Q	1.2	1.4	2.2		2.2	0.9	
M	2-0.17	2-0.17	2-0.17		2-0.17	2-0.17	

1100-1200	170E	170	175E	Q	175	170	Q
L	0.6	1.1	1.4	1.4	1.7	0.6	1.2
E	3.4	0.6	1.9	1.3	1.9	0	0.9
D	4.0	1.9	3.7	4.5	3.4		3.7
b=0.0 = 2.7 = 0.0							
Q	3.4	1.6	3.1		3.2	1.0	
M	2-0.16	2-0.16	2-0.16		2-0.16	2-0.16	

1200-1300	170E	170	175E	Q	175	170	Q
L	0.5	1.0	1.2	1.4	1.7	0.6	1.9
E	6.2	1.0	3.3	2.3	3.2	0	1.0
D	6.7	2.0	5.1	6.0	5.0		5.1
b=0.0 = 2.7 = 0.0							
Q	5.7	2.3	4.2		4.2	1.0	
M	2-0.14	2-0.14	2-0.14		2-0.14	2-0.14	

	Π _{DE}	Π _C	Π _{FE}	Q	Π _{FE}	Π _C	Q
L	0.5	0.4	0.6	1.1	0.6	0.3	1.1
E	3.2	1.5	0.3	0.3	0.3	0	0.4
B	2.0	1.4	0.9	1.7	0.4		1.4

$b \times D = 2.0 \times 1.5$

A	2.1	1.6	0.8		0.9	0.4	
n	2-D16	2-D16	2-D16		2-D16	2-D16	

	Π _{DE}	Π _C	Π _{FE}	Q	Π _{FE}	Π _C	Q
L	1.3	0.4	1.6	3.2	1.6	0.4	3.2
E	2.0	3.1	0.4	0.4	0.4	0.4	1.1
B	4.3	2.4	2.5	9.0	2.5		5.4

$b \times D = 2.0 \times 1.5$

A	2.0	3.3	2.1		2.1	1.1	
n	4-D16	2-D16	2-D16		2-D16	2-D16	

	Π _{DE}	Π _C	Π _{FE}	Q	Π _{FE}	Π _C	Q
L	1.3	0.4	1.6	3.2	1.6	0.4	3.2
E	12.3	5.6	1.2	5.0	1.2	0.5	1.6
B	13.6	6.4	2.4	13.2	2.4	1.4	6.4

$b \times D = 2.0 \times 1.5$

A	11.5	6.4	2.4		2.4	1.2	
n	2-D19	2-D19	2-D19		2-D19	2-D19	

$\Delta Q = 12 - 9.4 = 2.6$

$\Delta Q / Q = 2.6 / 9.4 = 0.27$

$\Delta b \times \pi = \frac{14.2}{2.0} \times 0.40 = 2.84 \rightarrow 10(10)$

NO	POE	TL	TR	Q	TR	TL	POE	Q
L	4.2	5.1	3.4	3.3	2.6	0.6	0	1.1
E	5.4	2.2	1.0	1.2	0.5	0.1	0.4	0.5
B	9.6						2.1	2.1

b x D = 2.0 x 17.5

2.0 x 50

A	5.1	4.2	3.6		3.3	0.4	0.5	
M	4-D16	3-D16	2-D16		2-D16	2-D16	2-D16	

NO	POE	TL	TR	Q	TR	TL	POE	Q
L	4.1	6.8	5.0	4.6	3.2	0.9	0.1	1.1
E	17.0	5.1	2.6	2.9	1.5	0.1	1.6	1.3
B	21.1	11.3	7.6	14.2	4.8		1.7	2.7

b x D = 2.0 x 17.5

2.0 x 50

A	11.5	6.5	4.2		4.1	1.1	1.4	
M	2-D19	2-D22	2-D19		2-D19	2-D19	2-D19	

NO	POE	TL	TR	Q	TR	TL	POE	Q
L	17.6	12.1	4.2	4.6	2.9	1.5	0.1	1.1
E	22.3	19.1	4.2	4.4	2.3	0	2.2	2.0
B	29.4	16.2	4.1	13.4	5.7		2.2	5.1

b x D = 2.0 x 17.5

2.0 x 50

A	16.3	8.6	5.0		4.8	1.3	2.0	
M	2-D22	2-D25	2-D22		2-D22	2-D22	2-D22	

$\Delta Q = 18.4 - 15.4 = 3.0$

$\Delta Q / b_j = 1.75 \quad p_w = 0.30$

$b_{10} x = 14.3 / 0.30 = 47.7 \rightarrow 15(A)$

WIMPEY

W	PE	PL	Q	W	PE	PL	Q
L	0.6	3.3	3.1	L	1.2	0.7	1.4
E	0.4	0	0.4	E	2.5	0.2	0.3
S	1.4			S			
		b x D = 2.8 x 50					
R	1.2	4.2			1.5	0.9	
W	2-D16	2-D16			2-D16	2-D16	

WING ROOM

W	PE	PL	PL	Q	W	PE	PL	Q
L	0.1	0.3	0.5	0.9	0.5	0.2	0.9	
E	1.6	0.4	0.8	1.0	0.8	0	0.7	
S	1.7	0.7	1.3	2.9	1.3		2.3	
		b x D = 2.8 x 50						
R	1.4	0.6	1.1		1.1	0.3		
W	2-D16		2-D16		2-D16		2-D16	

WING

W	PE	PL	PL	Q
L	0.3	0.7	2.1	5.3
E	0.5	4.0	8.7	2.0
S	1.0	11.7	11.6	4.3
		b x D = 2.8 x 71.5		
R	0.5	6.4	6.4	
W	2-D22	2-D22	2-D22	

DEMAND	PRICE	MC	MR	Q	TR	TC	MR	Q
L	6.7	10.8	12.3	12	120	26	0.4	15
E	9.0	4.1	1.2	1.4	1.6	4.3	10.1	2.6
S	16.7					6.9	10.5	10.5

$b \times D = 2.4 \times 9.0$

Q	7.0	11.7	12.6		12.1	3.1	4.7
M	2-D22 2-D16	4-D22	4-D22		4-D22	2-D22	2-D22

$Q = 12.0 - 12.5 = 15.4$

$\Delta Q = 12.0 - 12.5 = 1.2$

$\Delta Q / Q = 0.07$ $P1 = 0.24$ $\rightarrow 12 - 12 = 1.53 / 10.1 = 0.15$
 $\rightarrow 21.3 - 0.15$

DEMAND	PRICE	MC	MR	Q	TR	TC	MR	Q
L	6.7	16.6	12.2	12.0	14.0	4.5	0.8	17.15
E	9.2	4.4	0.7	1.5	0.9	4.6	10.1	2.4
S	16.1					9.1	10.9	12.2

$b \times D = 2.4 \times 9.0$

Q	7.2	11.2	12.9		12.6	4.1	4.9
M	2-D22 2-D16	4-D22	4-D22		4-D22	2-D22	2-D22

DEMAND	PRICE	MC	MR	Q	TR	TC	Q
L	0.1	0.1	1.9	0.4	3.0	3.0	2.6
E	6.9	2.3	1.2	2.6	1.7	0	0.2
S	7.0	2.9	2.2	0.1	3.3		

$b \times D = 2.4 \times 1.50$

Q	5.9	2.5	2.7		2.3	2.5
M	4-D16	2-D16	2-D16		2-D16	2-D16