



Bangladesh 国自動車修理  
工場建設計画実施設計報告書

第6編

78年10月

国際協力事業団

# Bangladesh 国 自動車修理工場建設計画 実施設計報告書

## 第 6 編

1978年10月

### 国際協力事業団

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バングラディッシュ国  
自動車修理工場建設計画  
実施設計報告書

第 6 編

1978年10月

国際協力事業団

国際協力事業団	
入館	53.11.22
分類	2001
発着	6595
	1140
	HP1

国際協力事業団	
受入 月日 '84. 5. 18	101
登録No. 05728	60
	MPI

マイクロ  
フィルム作成



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( TOTAL 572 )

／

Bangladesh 国

「自動車点検整備工場 建設プロジェクト」

構造計算書

国際協力事業団 1978年

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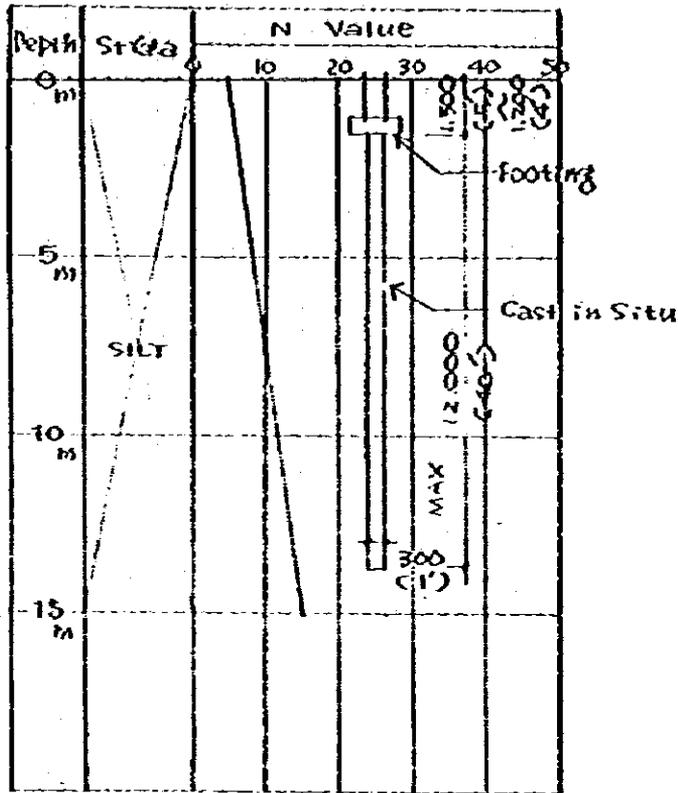
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〔 1978 8月 〕

〇 一 般 事 項 .

建物名称	バングラデシュ道路輸送公社 自動車点検整備工場		
建設場所	バングラデシュ ジョイデプール		
構造	鉄筋コンクリート造および鉄構造		
材 料	コンクリート	くい	Fc 210 <sup>kgf/cm<sup>2</sup></sup>
		基礎	Fc 150 <sup>kgf/cm<sup>2</sup></sup>
		上部構造	Fc 180 <sup>kgf/cm<sup>2</sup></sup>
	鉄筋	SD30およびMS鉄筋	
	鋼材	SS41	
	高力ボルト	F10T	
地震水平震度	0.10		
風 速	60M/秒		
適用規格・規準	日本工業規格 日本建築学会 設計計算規準		
地 耐力	独立基礎	長期	8.4 t/m <sup>2</sup>
	連続基礎	長期	6.2 t/m <sup>2</sup>
くい耐力	O.L. -13,000 付近まで施工する現場造成くい		
	φ300	長期	25 t/本
	φ350	長期	30 t/本
	φ400	長期	35 t/本

Approximate Bore Chart



Bearing Capacity of Soil

- Square Footing
  - 8.4 [t/m<sup>2</sup>]
  - 0.18 (t/ft<sup>2</sup>)
- Continuous Footing
  - 6.2 [t/m<sup>2</sup>]
  - 0.58 (t/ft<sup>2</sup>)

Formula of Bearing Capacity of Pile

$$R_n = \frac{1}{3} \left\{ 15 \bar{N} A_p + \left( \frac{N_s L_s}{H} + 2 N_c L_c \right) \psi \right\} - W \sim A_p q_c - W$$

$$\eta = 1 - \frac{\tan^{-1} d/p}{90} \left\{ \frac{(n-1)l}{m} + \frac{(l-1)m}{n} \right\}$$

e.g. Cf. Above Chart

	$\bar{N}$ 15
	$N_s$ 0
	$L_s$ 0
(1)	$\psi$ 300
	$L$ 12.000 ( $\frac{1}{\phi} = 40$ )
	$N_c$ 10 $\rightarrow$ 4 (Upper Limit)
	$L_c$ 12

$$R_n = \frac{1}{3} \left\{ 15 \times 15 \times \frac{\pi \times 0.3^2}{4} + 2 \times 4 \times 12 \times \pi \times 0.3 \right\} - \frac{\pi \times 0.3^2}{4} \times 12 \times 2.4$$

$$= \frac{1}{3} \{ 15.9 + 90.5 \} - 2.0 = 38.5 - 2.0 = 33.4$$

(  $33.4 / \pi \times 0.3 \times 15 = 2.36$  (t/m<sup>2</sup>) )

$$= \pi \times \frac{30^2}{4} \times 0.75 - 2.5 = 49.5 - 2.5 = 47.0$$

$$\eta = 1 - \frac{\tan^{-1} \frac{1}{2}}{90} \left\{ \frac{(3-1) \frac{1}{2}}{3 \times 3 \sim 2 \times 2} + \frac{(3-1) \frac{1}{2}}{2} \right\} = 0.926$$

DESIGN CAPACITY 25 (t/p)  $\leftarrow 33.4 \times 0.75$

(2)

ψ 350

$$R_a = \frac{1}{3} \left\{ 15 \times 15 \times \frac{\pi \times 0.35^2}{4} + 2 \times 4 \times 12 \times \pi \times 0.35 \right\} - \frac{\pi \times 0.35^2}{4} \times 12 \times 2.4$$

$$= \frac{1}{3} \{ 21.6 + 105.9 \} - 2.8 = 42.4 - 2.8 = 39.6$$

$\eta = 0.118$

DESIGN CAPACITY 30 (t/p)

(3)

ψ 400

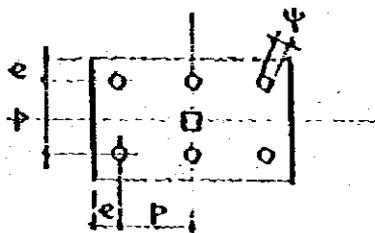
$$R_a = \frac{1}{3} \left\{ 15 \times 15 \times \frac{\pi \times 0.4^2}{4} + 2 \times 4 \times 12 \times \pi \times 0.4 \right\} - \frac{\pi \times 0.4^2}{4} \times 12 \times 2.4$$

$$= \frac{1}{3} \{ 28.3 + 120.6 \} - 3.6 = 49.6 - 3.6 = 46.0$$

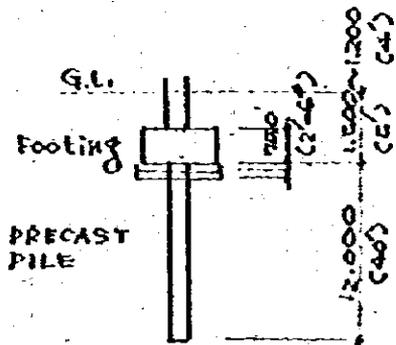
$\eta = 0.118$

DESIGN CAPACITY 35 (t/p)

Specification of Pile Works



$e = 1.5 \psi$   
 $P = 3 \psi$



Leveling concrete 150 (2")  
Brick soling 100 (3")

ψ	R <sub>a</sub>	m	ψ'
		Main R.	Spiral Hoop
300 (12")	24 (t/p)	6-DIS (L <sup>1/2</sup> / 8")	D10 (1/4")
350 (14")	30 (t/p)	"	"
400 (16")	35 (t/p)	"	"
CM	5/6 (kip)		

( 2.20459 [kip] = 1 [t] )

材料の許容応力度

(※)

材料	応力	長期								短期		
		引張り	圧縮	せん断	付着			溶接				
					位置 Fe	上筋	一般	つき合せ			すみ肉	
								一般	せん断			
コンクリート	Fe		50								x20	
	150			5							x15	
	Fe		60								x20	
	180			6							x15	
	Fe		70								x20	
210			7								x15	
鉄筋	Ms	1265	1125	1265								x133
	鉄筋				150	60	90					x15
					180	72	108					x15
	SD30	2000	2000	2000								x15
					150	100	150					x15
				180	120	180						x15
鋼材	SS41	1600	1500	900				1400	800	800		x15

高力ボルト 耐力

(1/本)

	長期		短期
	片面 摩擦	両面 摩擦	
M16	302	603	x15
20	471	942	
22	570	114	
24	678	136	

8,

1 事 務 所

1-1. LOAD

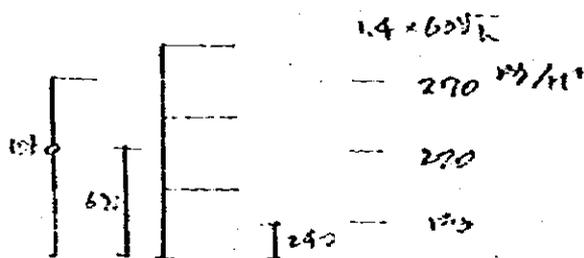
(i) DEAD LOAD

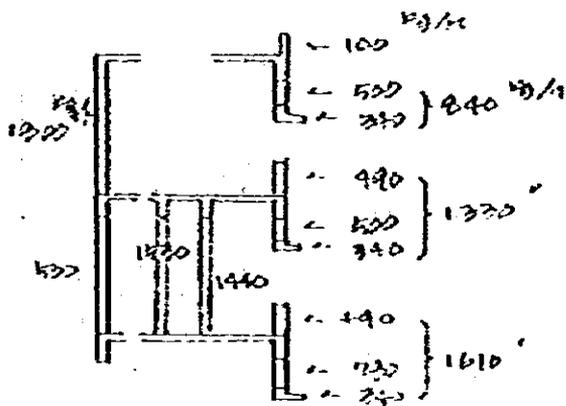
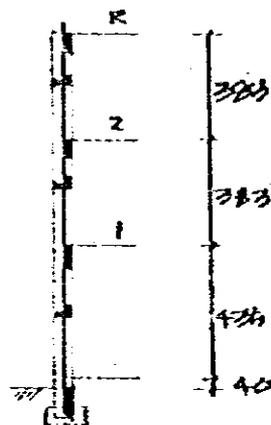
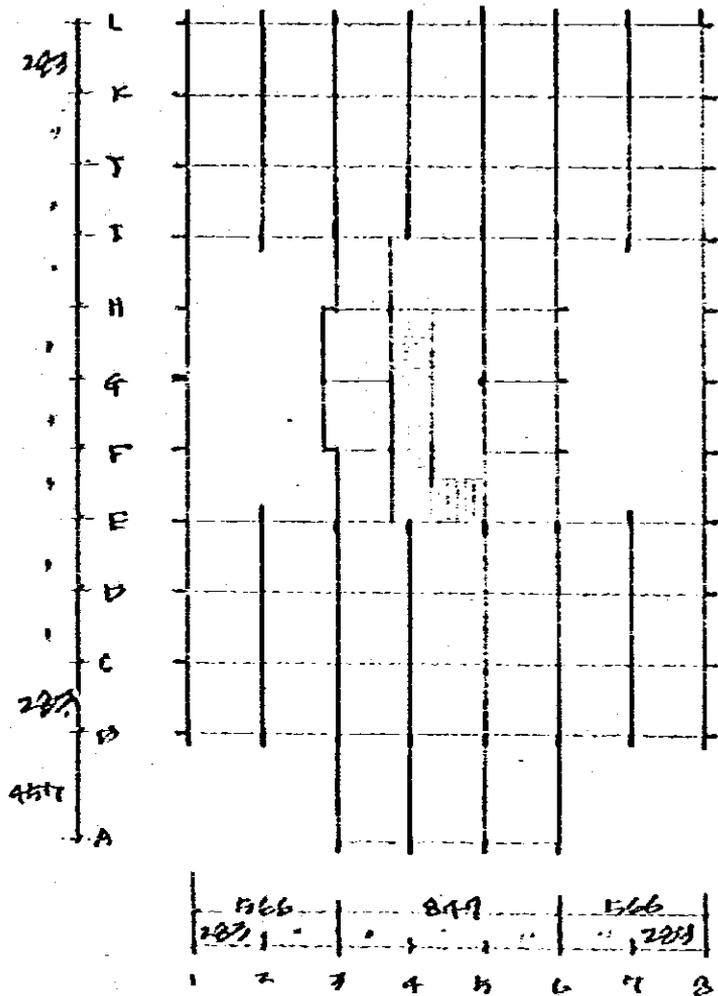
<u>ROOF</u>	UME CONCRETE	10 <sup>cm</sup>	200	} 460 <sup>kg/m<sup>2</sup></sup>
	RC. SLAB	10	240	
	CEILING		20	
<u>FLOOR</u>	TERRAZZO TILE	5	100	} 360
	RC SLAB	10	240	
	CEILING		20	
<u>WALL</u>	BRICK	25.5	490	} 540
	CEMENT MORTAR	2.5	50	
<u>COLUMN</u>	20 x 25		510	<sup>kg/m</sup>
<u>BEAM</u>	20 x 50		340	
	20 x 15		510	

(ii) LIVE LOAD

	SLAB	FLAT	EARTHQUAKE
FLOOR	300	180	90
ROOF	100	40	0

(iii) WIND PRESSURE





1-2.

C.122 CF BEAM

$W_k = 960 + 50 = 1010 \text{ kg/m}^2$

$W_m = 360 + 180 = 540 \text{ "}$

C.122A



$l_x = 203$

$\lambda = 1.00$

$C = 0.60W + w' \times 2.83^2/12$

$I_0 = 1.00W + w' \times 2.83^2/12$

$Q = 1.25W + w' \times 2.83^3/12$

$0.34 + 0.10 = 0.44$	$0.34 + 0.99 = 0.93$
$0.31 + 0.30 = 0.61$	$0.32 + 0.66 = 0.99$
$0.51 + 0.44 = 1.00$	$0.44 + 0.83 = 1.19$
$0.67 + 0.63 = 1.2$	$0.67 + 1.18 = 1.3$

C.122B



$l_x = 203$

$\lambda = 1.00$

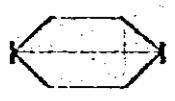
$C = 0.6 \times 2W + 0.27$

$I_0 = 1.0 \times 2W + 0.24$

$Q = 1.05 \times 2W + 0.43$

$w' = 0.34$	
0.8	0.9
1.4	1.4
1.6	1.6

C.122C



$l_x = 233$

$l_y = 566$

$\lambda = 2.00$

$w' = 0.61$

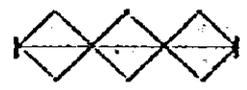
$C = 3.6 \times 2W + 1.76$

$I_0 = 5.4 \times 2W + 2.04$

$Q = 3.0 \times 2W + 1.44$

5.0	5.2
7.5	7.9
4.5	4.7

C.122D



$l = 899$

$w' = 0.61$

$C = 0.74W + 3.06$

$I_0 = 13.22W + 4.60$

$Q = 6.01W + 2.16$

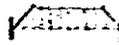
9.5	9.8
11.3	11.7
5.2	5.4

G431   $l_x = 240$   $\lambda = 1.00$   $w' = 0.34 + 1.53 = 1.87$

$$C = 0.35(2W + w' \times 2.4^2 / 12) \quad 0.37 + 0.16 = 0.53 \quad 0.39 + 0.90 = 1.29$$

$$N_0 = 0.6 \times 2.0 + w' \times 2.4^2 / 3 \quad 0.61 + 0.74 = 0.9 \quad 0.65 + 1.75 = 2.0$$

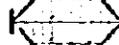
$$Q = 0.95 \times 2.0 + w' \times 2.4 / 2 \quad 0.77 + 0.44 = 1.2 \quad 0.81 + 2.24 = 3.1$$

G3AB   $l_x = 293$   $l_y = 457$   $\lambda = 1.61$   $w'_1 = 0.34 + 1.80 = 2.14$

$$C = 2.1W + w' \times 4.57^2 / 12 \quad 1.07 + 0.77 = 1.8 \quad 1.13 + 3.72 = 4.9 \quad 2.6$$

$$N_0 = 2.35W + w' \times 4.57^2 / 3 \quad 1.21 + 1.15 = 2.9 \quad 1.41 + 5.39 = 7.4 \quad 4.0$$

$$Q = 2.2W + w' \times 4.57 / 2 \quad 1.17 + 1.01 = 2.2 \quad 1.74 + 4.89 = 6.1 \quad 3.1$$

G4AB   $l_x = 293$   $l_y = 457$   $\lambda = 1.61$   $w' = 0.51 + 1.44 = 1.95$

$$C = 2.1 \times 2.0 + 0.29 \quad 3.0 \quad 3.2 \quad 5.7$$

$$N_0 = 2.35 \times 2.0 + 1.33 \quad 4.7 \quad 5.0 \quad 8.7$$

$$Q = 2.3 \times 2.0 + 1.17 \quad 3.6 \quad 3.6 \quad 6.9$$

R G5EF   $l_x = 203$   $l_y = 340$   $\lambda = 1.20$   $w' = 0.51$

$$C = (4.1 + 3.4) \times 0.51 + 1.36 \quad 5.2$$

$$N_0 = (6.8 + 5.6) \times 0.51 + 2.04 \quad 8.4$$

$$Q = (3.4 + 3.0) \times 0.51 + 1.44 \quad 5.7$$

B51  $l = 866$   $w = (0.54 + 2.34) \times 1.8 / 2 + 0.36 = 1.06$

$$N_0 = 1.06 \times 8.66^2 / 12 = 9.9$$

$$Q = 1.06 \times 8.66 / 2 = 4.6$$

G5B25   $l_x = 233$   $l_y = 243$   $\lambda = 1.0$

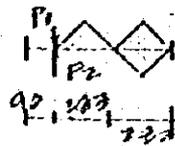
$$C_{15} = (3.4 + 1.5) \times 0.34 + 1.36 \quad 4.0$$

$$C_{68} = (3.4 + 0.6) \times 0.34 + 1.36 \quad 2.5$$

$$N_0 = (5.6 + 1.4) \times 0.34 + 2.04 \quad 5.8$$

$$Q = (3.0 + 1.5) \times 0.34 + 1.44 \quad 3.9$$

EN 46



$l = 6.66$

$w' = 0.121$

$P_1 = 1.6$

$P_2 = 1.6 \times 2 = 3.2$

$ZP = 10.8$

$C_{4b} = 7.30 + (1.87 + 2.29) \times 0.121 + 1.60 \quad 12.0$

$C_{6a} = 1.16 + (1.06 + 1.17) \times 0.121 + 1.87 \quad 4.2$

$P_0 = 4.96 + (1.38 + 2.84) \times 0.121 + 2.74 \quad 10.4$

$Q = 9.46 + (1.29 + 2.87) \times 0.121 + 1.60 \quad 17.7$

1-3 AXIAL FORCE OF COLUMN

	ROOF & FLOOR		WALL		BEAM	COLUMN	W	P
3A3	0.51 x 1.42 < 2.29	166	0.10 x 2.7 0.24 x 1.25	0.37 1.04	1.09	0.98	5.14	5.2
2C1	0.54 x "	176	1.20 x 1.91 1.33 x 1.25	3.44 1.39	1.09	1.95	9.93	15.1
1C1	0.54 x "	176	1.20 x 1.91 1.61 x 1.25	3.44 2.01	1.09	3.40	11.75	26.9
3A4	0.51 x 2.23 < 2.79	331	0.10 x 2.7 0.24 x 2.25	0.74 2.14	1.44	0.98	8.55	8.6
2C1	0.54 x "	350	1.33 x 2.25	3.37	1.86	1.25	10.55	19.2
1C1	0.54 x "	350	1.61 x 2.25	4.11	1.86	3.40	12.35	32.1
3B1	0.51 x 1.52 < 1.42	103	0.10 x 2.7 0.24 x 2.25	0.23 2.14	0.71	1.50	5.29	5.9
2C1	0.54 x "	109	1.33 x 2.25	3.37	0.87	3.14	7.60	13.5
1C1	0.54 x "	109	1.61 x 2.25 0.10 x 2.7	4.11 0.23	0.87	5.47	11.54	25.0
3C2	0.51 x 2.23 x (1.52 + 2.25) 3.51	351	0.10 x 2.7 0.24 x 2.25	0.23 2.14	3.01	0.98	9.32	9.8
2C1	0.54 x "	361	1.33 x 2.25	3.37	3.01	1.95	11.94	21.8
1C1	0.54 x "	361	1.61 x 2.25	4.11	3.01	3.40	14.33	35.9
3C3	0.51 x 1.42 x (1.52 + 2.25) 4.22	422	0.10 x 2.7 0.24 x 1.25 1.33 x 1.75	0.23 1.04 2.64	1.02	0.98	7.60	7.7
2C1	0.54 x "	447	1.20 x 1.57 1.33 x 1.25 1.61 x 1.25	2.73 1.39 2.01	1.02	1.95	13.25	21.5
1C1	0.54 x "	447	1.61 x 1.25 1.25 x 1.25	2.01 1.95	1.02	3.40	12.91	34.4
3C4	0.51 x 2.23 x 4.41	636			2.43	0.98	11.21	11.3
2C1	0.54 x "	674			3.93	1.95	12.62	23.9
1C1	0.54 x "	674			3.93	3.40	14.07	38.0
3C1	0.51 x (0.42 + 2.25) x 2.23 3.51	351	0.10 x 2.7 0.24 x 2.25	0.23 2.14	2.25	0.98	9.06	9.1
2C1	0.54 x "	361	1.33 x 2.25	3.37	2.25	1.25	11.18	20.2
1C1	0.54 x "	361	1.61 x 2.25	4.11	2.25	3.40	13.37	32.6
3C3	0.51 x (2.23 + 2.25) x 2.23 6.47	647			4.09	0.98	11.54	11.5
2C1	0.54 x "	685	1.33 x 2.25	3.37	4.09	1.95	15.29	27.3

	ROOF & FLOOR		WALL		STAIR	CEILING	W	P
1C13	0.54 x 4.50 x 2.43	6.85	1.53 x 2.55	3.90	4.09	2.04	17.88	45.2
2C11	0.51 x 1.42 x 1.92	1.03	0.10 x 2.8 0.51 x 2.55	0.20 2.19	0.87	0.98	5.30	5.3
2C1	0.54 x " "	1.09	0.53 x 1.28 1.73 x 2.55	1.64 3.39	0.87	1.95	7.94	13.2
1C1	0.54 x " "	1.09	0.53 x 1.28 1.61 x 2.55	1.64 4.11	0.87	2.40	11.11	24.4
3C13	0.51 x 2.43 x 2.54	5.11	0.10 x 2.8 0.51 x 2.55	0.20 2.19	1.73	0.98	10.20	10.2
2C1	0.54 x " "	5.91	1.53 x 1.28 1.73 x 2.55	1.64 3.39	1.73	1.95	14.48	24.7
1C1	0.54 x " "	5.91	1.61 x 2.55	4.11	1.73	2.40	14.65	29.3
3C14	0.51 x 2.23 x 2.54	5.11	1.53 x 1.28	5.86	3.25	0.98	9.34	9.3
2C1	0.54 x " "	5.91	1.53 x 2.43	5.86	3.25	1.95	16.47	30.4
1C1	0.54 x " "	5.91	0.10 x 2.8	0.20	3.25	2.40	17.12	53.9
3C11			0.10 x 2.8	0.20	2.12	0.98	3.38	3.4
2C1			0.53 x 2.55	1.28	2.12	1.95	5.35	8.7
1C1			0.50 x 2.55	1.28	0.87	2.40	5.55	14.3
3C13	0.51 x 1.07 x 2.43	1.54	0.10 x 2.8 0.51 x 2.55	0.20 2.19	2.44	0.98	7.38	7.4
2C1	0.54 x " "	1.64	1.73 x 2.55	3.39	2.44	1.95	9.42	16.8
1C1	0.54 x " "	1.64	1.61 x 2.55	4.11	1.19	2.40	10.34	27.1
3C14	0.51 x 4.50 x 2.54	6.13			2.90	0.76	1.39	9.8
2C1	0.54 x 2.10 x 2.54	2.17	1.53 x 2.55	2.19	1.18	0.55	4.97	19.4
1C1	0.54 x " "	4.17	1.53 x 2.55 0.10 x 2	0.20 0.20	1.18	1.18	10.43	29.8
3C16	0.51 x 2.31 x 2.53	4.17	0.13 x 2.55	0.33	3.80	0.98	8.90	8.9
2C1	0.54 x 1.62 x 2.53	2.17	0.13 x 2.55	0.33	1.18	1.95	5.63	14.6
1C1	0.54 x " "	2.17	0.13 x 2.55	0.33	1.18	2.40	7.08	21.7
3C13	0.51 x 1.07 x 2.53	1.56	0.10 x 2.8 0.51 x 2.55	0.20 2.19	2.44	0.76	6.78	6.8
2C1	0.54 x " "	1.64	1.53 x 1.28 1.80 x 2.55	1.64 4.75	2.44	0.72	11.10	17.9

	ROOF & FLOOR		WALL		FRAM	COLU/IB	W	F
1C45	054 x 1.27 x 2.33	1.64	1.53 x 1.78 1.00 x 55	1A5 4.74	2.44	1.13	11.56	29.4
2C45	051 x 3.31 x 2.07	4.19			3.46	0.53	0.82	0.6
2C1	050 x 1.42 x 5.16	2.34			2.46	1.16	3.96	17.4
1C1	050 x	4.34			2.16	1.89	4.69	27.5
2C45	051 x 4.25 x 2.27	6.13			2.90	0.36	0.33	9.0
2C1	050 x 2.43 x 2.43	4.32	1.53 x 3.14	3.24	2.90	0.72	11.25	20.11
1C1	050 x	4.32	1.53 x	3.24	2.90	1.13	11.74	32.4

1.-4 SEISMIC FORCE

ROOF	$0.46 \times 5711.0$	2416.0	
PARAPET	$0.10 \times 1725.2$	172.5	
WALL	$0.24 \times 2.55 \times 40$	85.17	
	$0.54 \times 1.66 \times 12.54$	11.2	} 12.4
ORNAMENT	$0.15 \times 1.66 \times 20.4$	5.1	
PARTITION	$0.46 \times 1.66 \times 42.1$	32.1	
BEAM	$0.34 \times 194.9$	66.3	
	$0.51 \times 121.3$	92.5	
COLUMN	$0.51 \times 2.04 \times 64$	70.17	620.1

2ND FLOOR	$0.44 \times 522.4$	231.6	
WALL	$12.8 \times 2.55 \times 50$	134.6	
	FROM UPPER STAIRS	48.0	
	$0.54 \times 1.66 \times 12.54$	11.2	} 54.9
ORNAMENT	$0.15 \times 1.66 \times 20.4$	5.1	
PARTITION	$0.46 \times 1.66 \times 29.2$	60.1	
BEAM	$0.34 \times 194.9$	66.3	
	$0.51 \times 103.9$	103.9	
COLUMN	$0.51 \times 3.43 \times 64$	132.4	801.6

1ST FLOOR	$0.44 \times 526.4$	231.6	
WALL	$1.61 \times 2.55 \times 20$	82.1	
	$0.44 \times 2.55 \times 20$	22.0	
	FROM UPPER STAIRS	84.6	
ORNAMENT	$0.15 \times 192 \times 35.7$	10.3	

PARTITION	$0.46 \times 1.92 \times 42.0$	37.8	
	$0.54 \times 1.86 \times 10.2$	10.1	
CEILING	$0.34 \times 190.9$	64.9	
	$0.51 \times 175.0$	89.3	
COLUMN	$0.51 \times 4.09 \times 69$	143.3	
PORCH ROOF	$0.10 \times 42 \times 5.0$	21.0	747.1

	W	K	Q	Q <sub>T</sub>
3	628.1	0.1	62.8	62.8
2	801.6	0.1	80.2	143.0
1	783.7	0.1	78.4	221.4

WIND PRESSURE

3	$0.27 \times 36.1 \times 3.43$	$= 33.76$
2	$0.22 \times \quad \quad \quad$	$= 23.53$
1	$0.13 \times 36.1 \times 4.05$	$= 19.05$

1-h STIFFNESS RATIO

	b x D	$J_{10}^4$	$l$	$K_{10}^4$	$\eta$	$k_c$
2C	28 x 75	98.9	383	25.1		2.57
	75 x 28	13.7	"	3.6		0.36
1C	28 x 75	98.9	475	20.7		2.07
	75 x 28	13.7	"	2.9		0.29
2C	28 x 28	5.1	383	1.3		0.13
1C	"	"	475	1.1		0.11
2C	40 x	12.5	383	3.3		0.33
1C	"	"	475	2.6		0.26
G	28 x 50	29.2	283	10.3	1.33	1.30
	"	"	"	10.3	1.57	1.62
	"	"	457	6.4	1.48	0.95
	"	"	723	12.8	1.48	1.89
	28 x 75	98.9	566	17.4	1.79	3.11
	"	"	849	11.6	2.0	2.32
	"	"	"	457	21.5	1.68
FG	32 x 90	212.6	283	75.1		7.51
	"	"	457	46.5		4.65
	"	"	566	37.6		3.76
	"	"	849	22.0		2.20

$K_0 = 10^3$

Ⓐ (Ⓔ Ⓕ)

1.37	1.37	1.62	1.62
296 (2.17)	236	236	236
1.37	1.37	1.62	1.62
296 (2.37)	236	236	236
1.37	1.37	1.62	1.62
219 (2.17)	219	219	219
1.51	1.51	1.51	1.51
243			243

Ⓐ

1.37	1.37	
236	236	283
1.37	1.37	
236	236	283
1.37	1.37	
219	219	475
1.51	1.51	
243	243	

Ⓒ Ⓓ Ⓔ Ⓕ

	2.11		2.11
257		217	
	2.11		2.11
257		257	
	2.11		2.11
227		227	
1.51	1.51	1.51	1.51
566			649

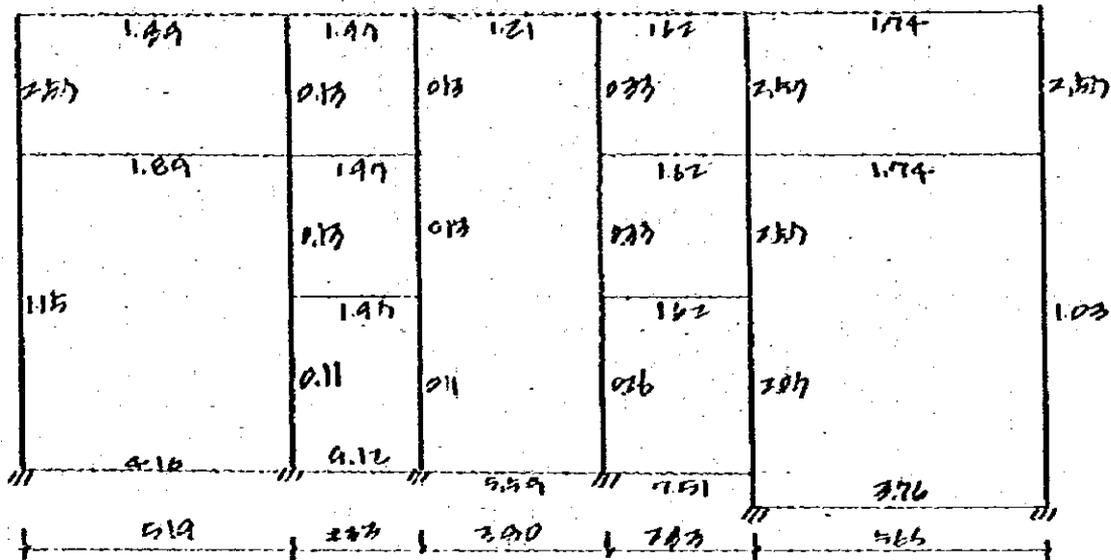
Ⓖ

1.37	1.37	1.37	1.37
296	236	236	236
1.37	1.37	1.37	1.37
236	236	236	236
1.37	1.37	1.37	1.37
219	219	219	219
1.51	1.51	1.51	1.51
243			243

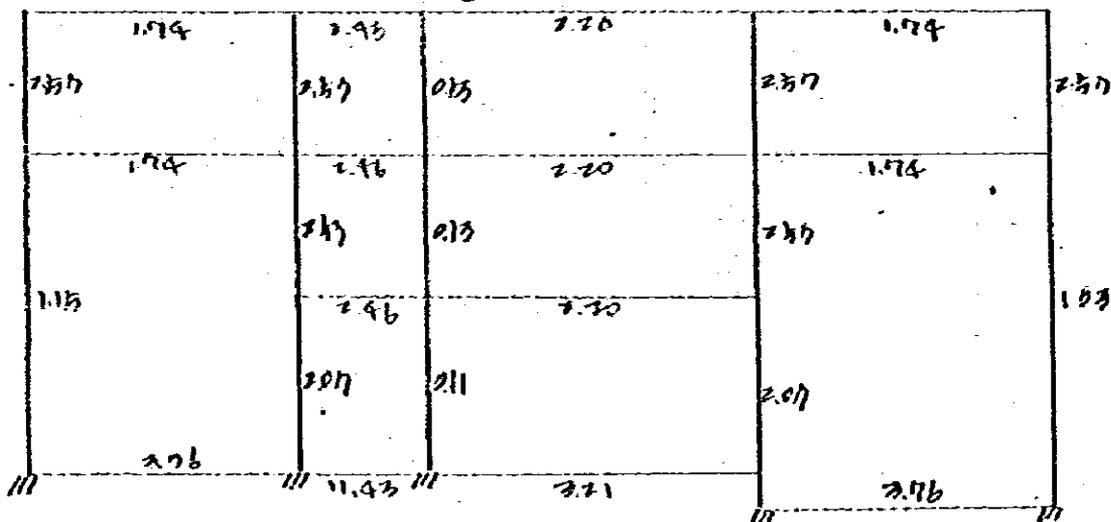
Ⓕ

1.74	2.46	2.20	1.74
257	257	213	257
1.74	2.46	2.20	1.74
	257	213	257
1.15	2.46	2.20	1.15
	217	211	217
1.51	1.51	1.51	1.51
566	126	663	566

④

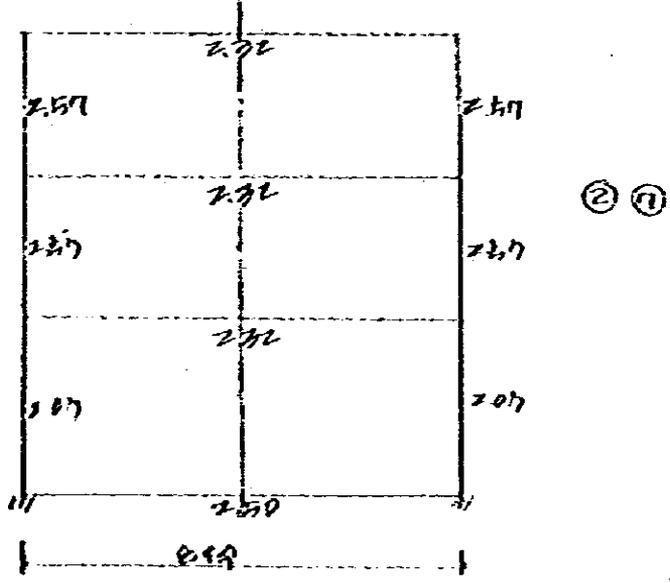


④



①      ②

	1.37	1.37	1.37	1.03	1.03	1.03
2.42	2.46	2.76	2.76	2.76	2.76	2.76
2.42	1.37	1.37	1.37	1.03	1.03	1.03
2.42	2.46	2.76	2.76	2.76	2.76	2.76
4.15	1.37	1.37	1.37	1.03	1.03	1.03
	2.19	2.29	2.39	2.39	2.39 (0.24)	2.39 (0.24)
	2.51	2.51	2.51	2.51	2.51	2.51
	2.87				2.87	



	2.45	1.62	1.62	1.62	1.37	1.37	1.37
2.57	2.57	2.76	2.76	2.76	2.76	2.76	2.13 (0.76)
2.45	1.62	1.62	1.62	1.37	1.37	1.37	
2.57	2.57	2.76	2.76	2.76	2.76	2.76	2.13 (0.76)
2.45	1.62	1.62	1.62	1.37	1.37	1.37	
2.07	2.07	2.29	2.29	2.07	2.29	2.11 (0.76)	
2.65	2.51	2.51	2.51	2.51	2.51	2.51	
2.87	2.87				2.87		

③  
④

①

2.61	2.32	
2.57	2.57	2.57
2.01	2.32	2.57
2.37	2.57	2.57
2.01	2.32	2.57
2.07	2.07	2.07
4.57	2.57	
4.57	6.44	

2.32	2.57
2.32	2.57
2.32	2.57
2.32	2.57
2.32	2.57
2.32	2.57
2.32	2.57
2.32	2.57

⑤

2.61	2.32	2.57	
2.57	2.57	2.57	2.32
2.61	2.32	2.57	2.32
2.57	2.57	2.57	2.32
2.61	2.32	2.57	2.32
2.07	2.07	2.07	2.16
4.57	4.57	3.76	
4.57	2.49	5.66	

④

1.37	1.37	1.37	1.62
	2.13	2.13	2.13
(1.37)	1.37	1.37	1.62
	2.13	2.13	2.13
	1.37	1.37	1.62
	0.11	0.11	0.11
	0.51	0.51	0.51
	2.67	"	2.67



(9)

0.24 0.69 1.3 0.42 -0.10	29.69 0.12 0.2 0.65 - )	19.81 0.12 0.2 0.65 - )	6.79 0.25 0.5 0.25 - )	1.31 1.02 1.9 0.76 - )	0.64 0.65 1.2 0.37 -0.10
1.64 0.66 1.6 0.57 - )	17.42 0.12 0.5 0.50 - )	15.15 0.11 0.5 0.50 - )	11.1 0.27 1.1 0.50 - )	0.97 0.86 2.8 0.25 -0.10	1.69 0.61 1.4 0.57 - )
	12.22 0.10 2.5 0.55 - )	14.10 0.10 0.5 0.55 - )	6.77 0.21 1.1 0.55 - )	0.76 0.95 5.0 0.65 - )	

$\Sigma x = 61.5$   
 $\Sigma x^2 = 36.27$

(11)

0.32 0.15 1.2 0.21 -0.10	1.37 1.15 2.1 0.43 - )	3.235 0.12 0.2 0.43 - )	1.57 1.11 2.0 0.38 - )	0.8 0.85 1.2 0.37 -0.10
1.51 0.66 1.5 0.57 - )	1.70 1.01 4.3 0.45 -0.05	3.235 0.12 0.1 0.50 - )	1.19 0.76 4.4 0.15 -0.07	1.69 0.61 1.4 0.57 - )
	1.17 1.10 5.3 0.59 - )	3.235 0.11 0.6 0.55 - )	1.06 1.06 5.6 0.60 - )	

0.14	0.29	0.14	0.29	0.29	0.29	0.29	0.15
0.77		1.32			1.32		0.77
0.77		1.32			1.32		0.77
0.24	0.29	0.79	0.79	0.29	0.29	0.79	0.24
0.15		1.12	0.12			1.11	0.15
0.14		0.72	0.72	0.72	1.02		0.14
0.66		1.15	0.12		1.03		0.66
0.24	0.29	0.79	0.79	0.29	0.29	0.79	0.24
0.77		1.32			1.32		0.77
0.77		1.32			1.32		0.77
0.24	0.29	0.79	0.79	0.29	0.29	0.79	0.24
0.24	0.29	0.79	0.79	0.29	0.29	0.79	0.24

02A							
127		122			122		091
127		122			122		197
02A							
022		101	012		022		022
022		012	011	022	022		022
022		101	012		022		022
02A							
127		122			122		197
02A		122			122		022
02A							
		02A	02A	02A	02A		

$2D = 1070$   
 $IR = 22.7A$   
 $(127 \rightarrow 91)$

$127 = 22.7A - 91 = 2177$   
 $2D_x = 91.7A$

127	022	022	022	022	022	022	127
112		120			120		112
112		120			120		112
020	022	022	022	022	022	022	020
		10	11		106		
		20	20	221	022		
		110	010		022		
020	022	022	022	022	022	022	020
112		120			120		112
112		120			120		112
127	022	022	022	022	022	022	127
		022	022	022	022		

①

0.35	7.61	6.67	5.72
0.59	0.29	0.28	0.27
1.1	0.5	0.5	0.5
0.23	0.45	0.45	0.45
0.35	7.61	6.67	5.72
0.59	0.29	0.28	0.27
1.5	1.2	1.2	1.1
0.45	0.50	0.50	0.50
0.73	9.45	8.77	7.10
1.22	0.25	0.25	0.24
6.3	1.3	1.3	1.2
0.15	0.55	0.55	0.55

②

0.90	1.40	2.30	0.90
0.79	1.06	1.37	0.79
1.4	1.4	2.4	1.4
1.35			0.25
0.90	1.40	2.30	0.90
0.79	1.06	1.37	0.79
3.1	4.2	5.4	3.1
0.45	0.45	0.45	0.45
1.12	1.74	2.46	1.12
1.07	1.24	1.43	1.07
5.3	6.2	7.1	5.3
0.60	0.55	0.60	0.60

③

③

0.79	1.02	1.00	1.16	7.61	21.07
0.40	0.47	0.29	0.90	0.29	0.12
0.8	1.6	0.5	1.7	0.5	0.2
0.25	0.25	0.25	0.25	0.45	0.45
0.79	1.02	1.00	1.16	7.61	21.07
0.40	0.47	0.29	0.90	0.29	0.12
1.6	3.7	1.2	4.0	1.2	0.5
0.45	0.45	0.50	0.45	0.50	0.50
0.56	1.27	1.17	1.44	9.25	24.91
0.30	1.2	0.26	1.17	0.25	0.10
4.2	5.3	1.3	6.0	1.3	0.5
0.71	0.59	0.55	0.55	0.55	0.55

④

1.356	21.07	19.42
0.12	0.12	0.12
0.2	0.2	0.2
0.45	0.45	0.45
19.46	21.07	19.47
0.12	0.12	0.12
0.5	0.5	0.5
0.50	0.50	0.50
24.2	24.91	23.55
0.10	0.10	0.10
0.5	0.5	0.5
0.55	0.55	0.55

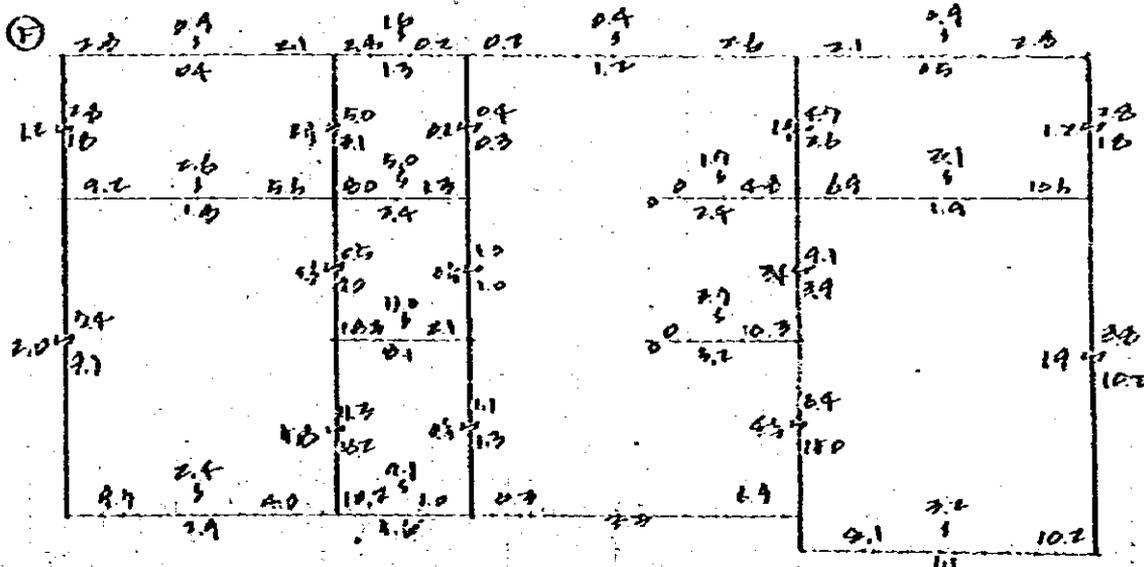
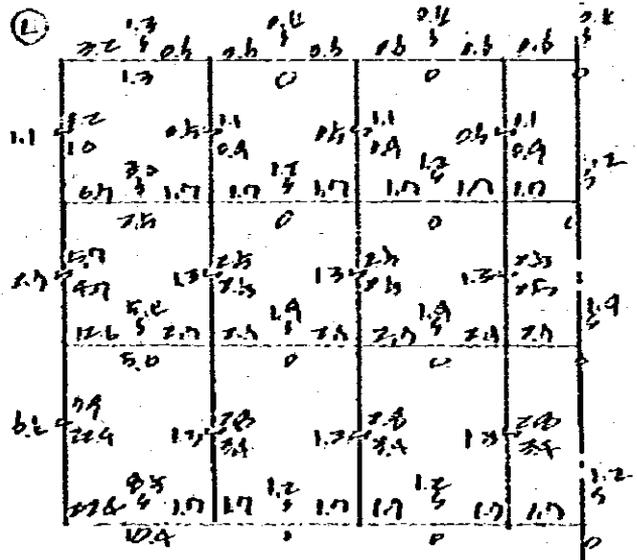
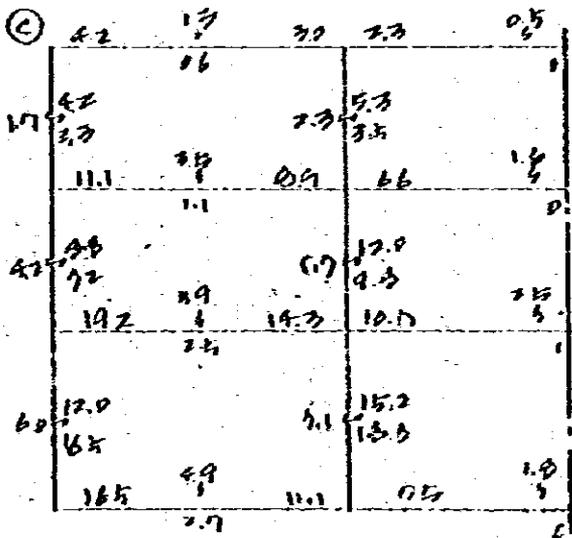
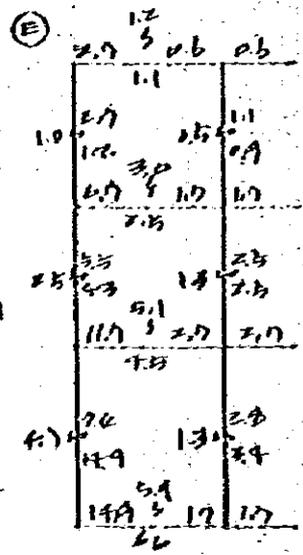
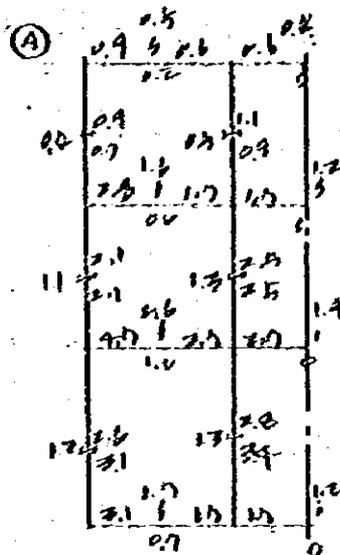
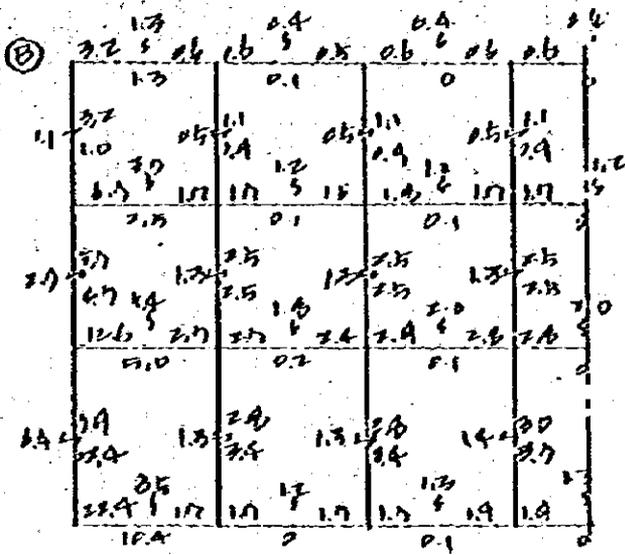


100	025	024	025	024	024	024	024	025	025	025	025	100
100			100									100
100	026	026	026	026	026	026	026	026	026	026	026	100
100			100									100
100	027	027	027	027	027	027	027	027	027	027	027	100
100			100									100
100	028	028	028	028	028	028	028	028	028	028	028	100
100			100									100
100	029	029	029	029	029	029	029	029	029	029	029	100
100			100									100
100	030	030	030	030	030	030	030	030	030	030	030	100
100			100									100

$2x = 494$

$10 = 2219$

(2) STRESS DIAGRAM OF SEISMIC FORCE

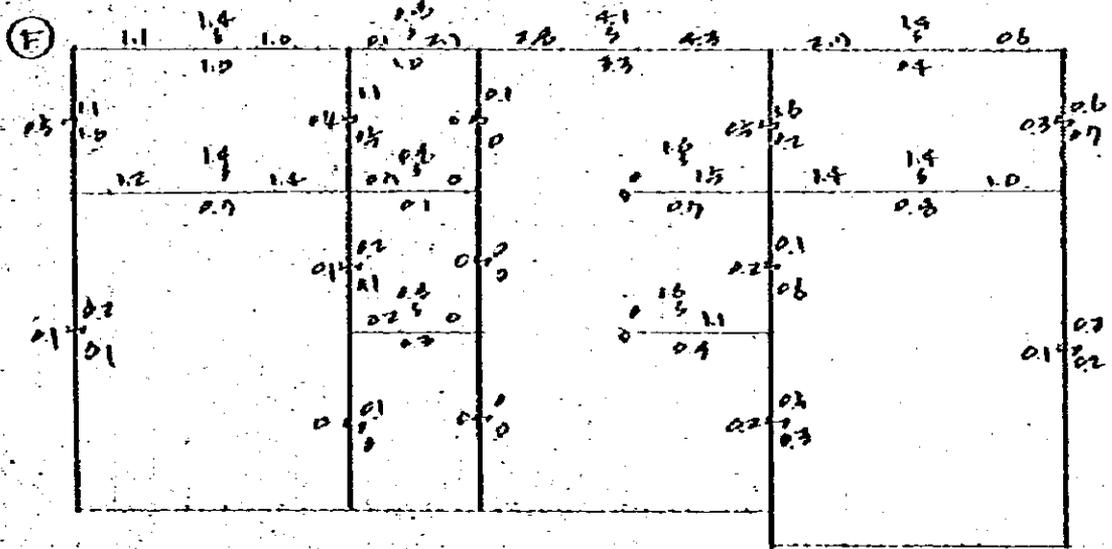
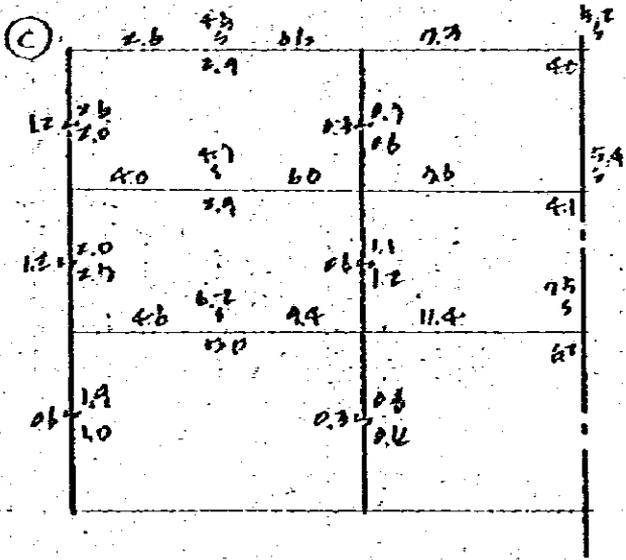
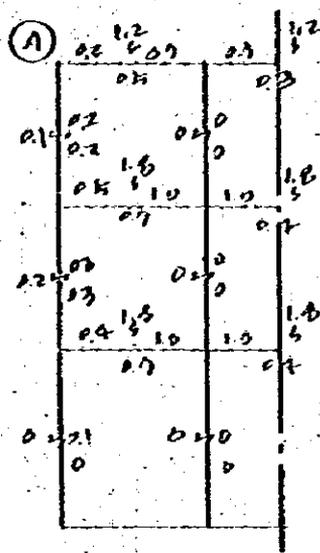
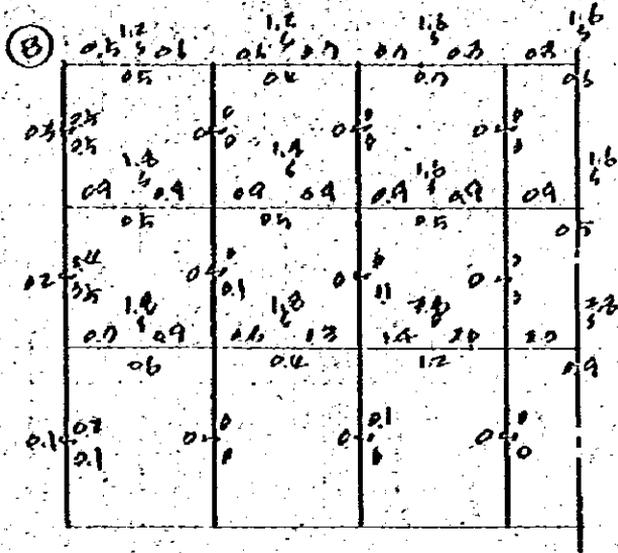








(3) STRESS DIAGRAM OF VERTICAL LOAD



④

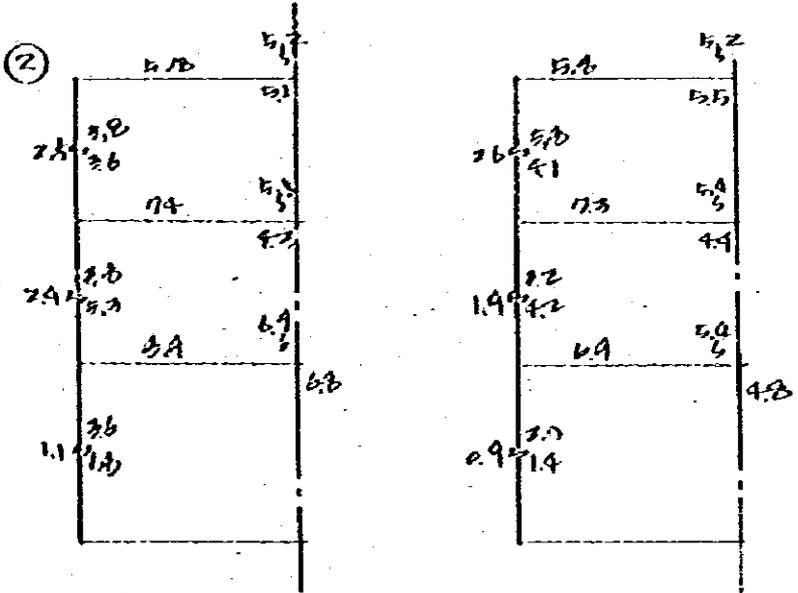
	1.0	1.4	1.0	1.2	1.4	1.4	2.3	1.5	1.4	1.6	1.3	1.4	1.1
0.5	1.0	1.0	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.2	0.5	0.3	1.1
	1.0	1.4	1.0	1.3	0.1			0.2	1.3	1.3	1.5	1.4	2.0
		0.0		0.1				0.7				0.6	
0.1	0.2		0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.5	0.1
	0.1			1.3				0.2	0.4	0.9			0.0
			0.0		0.0	0.0	0.0	0.1	0.0	0.1	0.2		0.0

⑤

	1.1	1.4	1.1	2.0	2.5	2.0	4.1	2.6	2.5	1.9	0.0	
0.5	1.1	0.9	0.7	1.4	0.7	0.2	0.2	1.0	2.1	1.6	0.9	0.3
	1.2	1.4	1.1	1.2	2.2	1.2	1.2	5.9	2.1	1.4	0.9	0.7
		0.9		1.3	2.0	2.0	4.0			0.5		
0.1	0.2		0.6	1.2	0.2	0.2	1.2	1.7	2.2	2.9		0.2
	0.1		1.1	1.6	2.7	2.3	4.8					0.1
			0.2	2.5	2.1	0.1	4.4	0.6	1.9	1.2		0.1
			0.2	2.3	0.1	0.1						

①

	1.2 0.5 0.6	1.2 0.4 0.1	1.2 0.6 0.3	1.1 0.5 0.2	0.9 0.4 0.1	0.4
0.3 0.5	0.5 0.9 0.9	0.4 0.2 0.4	0.6 0.4 0.7	0.2 0.7 0.6	0.2 0.6 0.6	0.6
0.2 0.5	0.4 0.7 0.9	0.5 0.4 0.4	0.6 0.4 0.3	0.2 0.7 0.6	0.2 0.6 0.6	0.6
0.1 0.2	0.2 0.1 0.1	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0



③

	1.5 1.2 1.4	1.1 0.5 0.6	1.2 0.3 0.3	1.5 0.2 0.6	0.6 0.6 0.6	0.5 0.5 0.5	0.6
0.7 1.2	1.5 2.4 2.7	0.5 2.0 2.0	0.3 2.0 1.5	0.2 1.3 0.7	0.2 0.9 0.9	0.2 0.9 0.9	0.6
0.7 1.2	1.2 2.2 2.7	0.7 2.1 1.4	0.0 1.9 1.5	0.1 1.3 0.5	0.1 0.4 0.9	0.0 0.8 0.9	0.6
0.2 0.2	0.7 0.2 0.2	0.0 0.1 0.1	0.0				

④

	0.1	0.2	0.3	0.4	0.5
0.1	1.7	1.0	1.1	1.2	1.3
0.2	1.6	1.4	1.5	1.6	1.7
0.3	1.5	1.4	1.3	1.2	1.1
0.4	1.4	1.3	1.2	1.1	1.0
0.5	1.3	1.2	1.1	1.0	0.9

⑤

	1.1	1.2	1.3	1.4	1.5	1.6	1.7
1.1	1.7	1.0	1.1	1.2	1.3	1.4	1.5
1.2	1.6	1.4	1.5	1.6	1.7	1.8	1.9
1.3	1.5	1.4	1.3	1.2	1.1	1.0	0.9
1.4	1.4	1.3	1.2	1.1	1.0	0.9	0.8
1.5	1.3	1.2	1.1	1.0	0.9	0.8	0.7
1.6	1.2	1.1	1.0	0.9	0.8	0.7	0.6
1.7	1.1	1.0	0.9	0.8	0.7	0.6	0.5

⑥

	1.1	1.2	1.3	1.4	1.5
1.1	1.7	1.0	1.1	1.2	1.3
1.2	1.6	1.4	1.5	1.6	1.7
1.3	1.5	1.4	1.3	1.2	1.1
1.4	1.4	1.3	1.2	1.1	1.0
1.5	1.3	1.2	1.1	1.0	0.9

1-7 DESIGN OF SECTION

(1) BEAM

2GA326	$\mu_{OE}$	$\mu_{CL}$	$\mu_{CE}$	$Q$
L	0.2 <small>0.1</small>	0.5	0.7	1.2
E	0.9	0.2	0.6	0.5
S	1.1 0.7	0.7	1.3	2.2

$b \times d = 24 \times 50 \quad d = 45 \quad f_c = 39.3$

$Q_{OA} = 24 \times 39.3 \times 6 = 6600$

$Q_{OE} = 110 / 39.3 \times 30 = 0.9$

$Q_S = 1200 / 39.3 \times 0.7 = 4.2 \quad \left. \begin{matrix} \\ \\ \end{matrix} \right\} 2-D13$

3GA326	$\mu_{OE}$	$\mu_{CL}$	$\mu_{CE}$	$Q$
L	0.5	0.7	1.0	1.8
E	2.4	0.6	1.7	1.6
S	2.7 2.3	1.3	2.0 0.7	5.0

$b \times d = 24 \times 50$

$Q_{OE} = 370 / 39.3 \times 30 = 2.8 \quad 2-D16$

$Q_{IE} = 340 / \quad = 2.9$

2GA325	$\mu_{OE}$	$\mu_{CL}$	$\mu_{CE}$	$Q$
L	0.4	0.7	1.0	1.8
E	4.7	1.0	3.7	2.6
S	5.1 4.3	1.7	4.7 2.7	7.0

$b \times d = 24 \times 50$

$Q_{OE} = 510 / 39.3 \times 30 = 4.3 \quad 2-D19$

$Q_{IE} = 470 / \quad = 4.0$

1981-82	$\pi_{EF}$	$\pi_C$	$\pi_{FE}$	$Q$	$\pi_E$	$\pi_C$	$Q$
L	0.5	0.5	0.6	12	0.8	0.7	16
E	3.2	1.3	0.6	13	0.6	0	0.7
S	3.7	1.0	1.2	3.8	1.4		
$b \times D = 28 \times 50$							
A	3.1	1.5	1.0		1.2	0.9	2.0
n	4-D13		2-D13		2-D13		
		2-D13				2-D13	

2481-82	$\pi_{EF}$	$\pi_C$	$\pi_{FE}$	$Q$	$\pi_E$	$\pi_C$	$Q$
L	0.9	0.5	0.9	18	0.9	0.5	18
E	6.7	2.5	1.7	30	1.0	0.1	12
S	7.6	3.0	2.6	7.8	2.7		4.2
$b \times D = 28 \times 50$							
A	6.4	2.5	2.2		2.3	0.6	
n	4-D16		2-D16		2-D16		
		2-D16				2-D16	

2681-82	$\pi_{EF}$	$\pi_C$	$\pi_{FE}$	$Q$	$\pi_E$	$\pi_C$	$Q$
L	0.7	0.6	0.9	1.0	2.0	1.2	3.8
E	12.6	5.0	2.7	5.4	2.9	0.1	2.0
S	13.3	5.6	3.6	12.6	4.9		7.8
$b \times D = 28 \times 50$							
A	11.3	4.7	3.1		4.1	1.5	
n	4-D19		2-D19		2-D19		
		2-D19				2-D19	

$QD = 7.8 \times 2.9 \times 9 = 9AD^T$   
 $QD = 12.6 - 9.9 = 2.7$   
 $QD/b_j = 2.45$        $PW = 0.76$   
 $D10 = 14.7/2.0 \times 2.36 = 14.2 \rightarrow 10 \text{ @}$

2G C126	$\mu_{ES}$	$\mu_C$	$\mu_{EF}$	$Q$	$\mu_E$	$\mu_C$	$Q$
L	2.6	2.9	6.6	4.3	17.3	4.0	5.2
E	4.2	0.6	3.0	1.7	2.3	0	0.5
S	6.3		4.6	2.1	9.6		

$b \times D = 2.2 \times 2.8 \times 17.1, \quad j = 61.2$

$IQ_A = 2.6 \times 61.2 \times 1.0 = 16.3^T \quad SQ_A = 15.4$

a	2.7	2.9	4.7		5.2	3.3	
m	2-D16		4-D16		4-D16		2-D16

2G C126	$\mu_{ES}$	$\mu_C$	$\mu_{EF}$	$Q$	$\mu_E$	$\mu_C$	$Q$
L	4.0	2.9	6.0	4.7	7.6	4.1	5.4
E	11.1	1.1	4.9	2.6	6.5	0	1.6
S	15.1		14.9	11.7	14.2		8.6

$b \times D = 2.2 \times 2.8 \times 17.1$

a	2.7	2.9	3.1		7.6	3.3	
m	4-D19		4-D19		4-D19		2-D19

2G C126	$\mu_{ES}$	$\mu_C$	$\mu_{EF}$	$Q$	$\mu_E$	$\mu_C$	$Q$
L	4.5	5.0	9.4	6.2	11.9	6.2	7.5
E	19.2	2.5	11.3	5.9	10.5	0	2.5
S	23.6		23.7	18.0	22.1		12.5

$b \times D = 2.8 \times 17.1$

a	13.9	4.1	12.9		12.1	13.1	
m	4-D22		4-D22		4-D22		2-D22

$\Delta Q = 19.0 - 13.4 = 5.6$

$0.9/0.9 = 1.92 \quad P_0 = 0.30$

$D_{10} \times = 14.3 / 1.0 = 14.3 \rightarrow 15.0$

2GF 1-2	RF	RC	RE	Q	RF	RC	RE	Q	RF	RC	RE	Q
L	1.1	1.0	1.3	1.4	2.7	1.0	0.8	4.6	3.3	4.1		
E	2.5	1.7	2.4	1.0	0.2	1.4	1.6	2.5	1.3	0.9		
S	4.6	2.7	3.5	3.4		2.4	4.0	7.3		4.5		
	b x D = 2.8 x 1.5				2.4 x 5.0				2.8 x 7.5			
A	2.5	1.5	2.0		3.4	2.0		4.0	2.7			
n	2-D16		2-D16		2-D16		2-D16		2-D16		2-D16	

2GF 1-3	RF	RC	RE	Q	RF	RC	RE	Q	RF	RC	RE	Q
L	1.2	0.6	2.1	1.4	6.4	2.7	2.2	5.4	4.0	12.2		
E	10.6	4.2	6.9	3.1	0.7	3.7	5.0	7.5	3.5	1.3		
A	11.3	5.2	9.0	2.6		6.5	12.2	13.4	7.5			
	b x D = 2.8 x 1.5				2.8 x 5.0				2.8 x 7.5			
					$\Delta D = 7.7 - 9.4 = 2.3$			$\Delta D = 12.2 - 10.3 = 1.9$				
					$\Delta P / P = 2.09$			$\Delta P / P = 1.11$				
					$PW = 0.33$			$PW = 0.31$				
					$P10x = 15.4 \rightarrow 10\%$			$P10x = 16.5 \rightarrow 10\%$				
A	6.4	2.8	4.9		8.7	5.2		7.3	4.1			
n	4-D19		2-D19		4-D19		2-D19		4-D19		2-D19	

2GF 1-2	RF	RC	RE	Q	RF	RC	RE	Q	RF	RC	RE	Q
L	0.4	0.4	1.6	1.6	2.1	6.7	2.2	7.3	4.4	4.8	12.2	
E	13.1	4.5	6.3	13.1	8.6	1.2	3.4	11	8.0	17.1	2.0	
S	14.3	5.5	14.2	20.0	11.5	19.0		12.4	21.9			
	b x D = 2.8 x 1.5				2.8 x 5.0				2.8 x 7.5			
A	12.1	0.6	12.0	16.9	2.1	8.5		6.0	6.8	9.3		
n	4-D22		4-D22	2-D22	4-D22		4-D22	2-D22	4-D22		4-D22	
					$\Delta D = 6.2$			$\Delta D = 9.1$				
					$\Delta P / P = 2.91$			$\Delta P / P = 3.26$				
					$P10x = 11.3 \rightarrow 10\%$			$P10x = 17.1 \rightarrow 10\%$				

STATE	ME	MC	MSE	Q	ME	MC	Q
L	0.5	0.5	0.6	1.2	0.5	0.5	1.2
E	2.3	1.4	0.6	1.4	0.6	0	2.4
S	3.3	1.9	1.2	5.0	1.1		2.0

$b < D = 2.8 < 5.0$

A	2.2	1.6	1.0	0.9	0.6		
n	4-D13	2-D13	2-D13	2-D13	2-D13	2-D13	

STATE	ME	MC	MSE	Q	ME	MC	Q
L	0.9	0.5	0.9	1.6	0.7	0.6	1.8
E	6.3	2.9	1.6	2.7	1.8	0.1	1.2
D	7.2	2.9	2.5	7.2	2.5		5.2

$b < D = 2.8 < 5.0$

A	6.1	2.4	2.1	2.1	0.8		
n	4-D16	2-D16	2-D16	2-D16	2-D16	2-D16	

STATE	ME	MC	MSE	Q	ME	MC	Q
L	0.7	0.6	0.9	1.8	0.7	0.6	1.8
E	12.1	4.8	2.6	5.2	2.9	0.2	1.9
S	12.3	5.4	3.5	12.2	3.6		5.6

$b < D = 2.8 < 5.0$

A	10.8	4.6	3.0	3.0	0.8		
n	4-D19	2-D19	2-D19	2-D19	2-D19	2-D19	

$\Delta Q = 12.2 - 9.9 = 2.3$

$\Delta Q / b_j = 2.09 \quad PW = 0.33$

$b < D = 15.3 / 2.8 < 5.0 = 5.46 < 10.8$

2G2BE	RE	RI	Q
L	5.3	5.5	5.2
E	3.5	0	0.8
D	9.3		
	$b \times D = 2.8 \times 7.5$		
G	5.1	4.5	
M	4.16	4.16	

2G4	RE	RI	Q
	1.0	0.9	1.6
	0.2	0.1	0.1
	$b \times D = 2.8 \times 5.0$		
	1.3	1.1	
	2.013	2.013	

3G2BE	RE	RI	Q
L	11.4	4.3	5.4
E	0.6	0	2.0
D	15.0		4.6
	$b \times D = 2.8 \times 1.5$		
G	0.6	3.5	
M	4.019	2.019	

3G4	RE	RI	Q
	2.4	1.7	2.3
	0.7	0.3	0.5
	$b \times D = 2.8 \times 5.0$		
	3.0	2.2	
	2.016	2.016	

2G2BE	RE	RI	Q
L	0.9	6.0	6.9
E	14.9	0	4.0
D	25.0		14.9
	$b \times D = 2.8 \times 7.5$		
G	14.1	5.6	
M	4.022	2.022	

2G4	RE	RI	Q
	2.4	1.7	3.3
	1.2	0.5	0.8
	$b \times D = 2.8 \times 5.0$		
	3.0	2.2	
	2.016	2.016	

مقطع	م.ع	م.ل	م.ع	Q	م.ع	م.ل	م.ع	Q	
L	1.5	1.7	1.3	2.2	1.1	0.11	0.8	1.6	
E	2.3	0.9	1.5	0.8	2.5	1.0	0.6	1.1	
S	3.0		2.7	2.0	3.6	1.7	1.4	3.8	
b x D = 2.0 x 175					2.4 x 50				
A	2.1	1.1	1.8		3.0	1.4	1.2		
n	2-D13	2-D13	2-D13	4-D3		2-D13	2-D13		

مقطع	م.ع	م.ل	م.ع	Q	م.ع	م.ل	م.ع	Q	
L	2.4	1.5	2.7	2.1	2.0	0.9	2.0	3.8	
E	4.6	0.4	3.0	1.8	6.2	2.3	1.6	2.7	
S	7.0		6.5	6.7	8.2	3.2	2.6	9.2	
b x D = 2.1 x 175					2.6 x 50				
A	3.6	1.2	2.1		6.9	2.7	3.0		
n	2-D16	2-D16	2-D16	4-D16		2-D16	2-D16		

مقطع	م.ع	م.ل	م.ع	Q	م.ع	م.ل	م.ع	Q	
L	2.7	1.6	2.7	2.1	2.1	0.9	1.9	3.8	
E	0.9	1.1	6.7	2.9	11.0	4.2	2.6	4.8	
S	12.1	2.7	9.9	9.9	13.1	5.1	4.5	13.4	
b x D = 2.8 x 175					2.4 x 50				
A	6.6	1.5	5.1		11.1	4.7	3.8		
n	4-D19	2-D19	2-D19	4-D19		2-D19	2-D19		

$\Delta D = 13.4 - 9.9 = 3.5$   
 $\Delta \sigma / \sigma = 3.18$   
 $P_w = 0.91$   
 $V_{10} \times 2 \times 175 / 2.8 \times 175 = 12.4 \rightarrow 13.0$

REGRADE	NOE	NC	NSE	Q	NSE	NC	NOE	Q
L	0.7	1.7	5.5	3.5	7.6	9.9	5.3	5.2
E	4.3	0.5	3.7	1.7	2.1	0.7	3.5	0.15
B	5.0		11.5	6.9			8.8	

$b \times D = 2.8 \times 17.5$

A	2.7	1.5	4.9		6.2	4.0	4.8	
M	2-D16	2-D16	4-D16		4-D16	2-D16	4-D16	

REGRADE	NOE	NC	NSE	Q	NSE	NC	NOE	Q
L	1.6	1.0	4.9	3.6	4.9	4.6	9.0	6.9
E	11.4	1.2	2.1	4.5	6.3	1.1	8.6	1.7
S	13.0	2.2	14.0	12.6	15.2		17.4	10.3

$b \times D = 7.8 \times 17.5$

A	7.1	1.5	7.6		11.3	3.6	9.5	
M	4-D19	2-D19	4-D19		4-D19	2-D19	4-D19	

REGRADE	NOE	NC	NSE	Q	NSE	NC	NOE	Q
L	1.2	1.2	6.4	3.6	11.6	7.5	9.3	7.6
E	20.7	2.6	15.0	7.0	9.8	3.6	16.9	3.1
B	21.4	3.5	21.4	14.0	21.4		26.2	10.15

$b \times D = 7.8 \times 17.5$

A	11.7	2.1	11.7		11.7	6.1	14.3	
M	4-D22	2-D22	4-D22		4-D22	2-D22	4-D22	

$\Delta P = 19.0 - 15.4 = 3.6$

$\Delta P / L = 2.19 \quad P_w = 0.33$

$P_{10} \times 0.147 / 2.8 \times 0.33 = 15.0 \rightarrow 10 \text{ @}$

24 554	$\mu_{12}$	$\mu_{11}$	$\mu_{225}$	$\alpha$
L	5.9	3.1	4.8	4.17
E	7.1	1.1	0.6	0.6
D	0.0			

$b \times D = 2.0 \times 115$

A	4.7	2.5	3.9
M	4.016	2.016	2.016

261	$\mu_{12}$	$\mu_{11}$	$\mu_{225}$	$\alpha$
L	5.2	1.7	2.0	3.9
E	7.1	2.0	1.6	1.6
D	12.5	4.2	4.4	11.1

$b \times D = 2.0 \times 115$

A	6.0	2.5	2.9
M	4.49	2.019	2.019

262	$\mu_{12}$	$\mu_{11}$	$\mu_{225}$	$\alpha$
L	5.9	1.6	2.5	3.9
E	11.9	4.7	2.5	2.7
D	17.0	6.3	5.0	4.2

$b \times D = 2.0 \times 115$

A	4.7	3.4	2.7
M	4.022	2.022	2.022

(2) COLUMN

<u>3CA3</u>	x P y	x M y	x Q y
L	5.2	0.2 0.2	1.1 1.2
E	4.5 0.6	0.9 0.7	2.4 0.8
S	5.7 6.0 4.7 4.4	1.1 3.6	0.9 2.3

$w/b = 7.7/2.0 = 13.7 < 15$   
 $s \times Q_s = 13.6$   
 $s \times Q_A = 15.4$

$b \times D = 2.0 \times 17.5$        $d_x = 2.0 \times 10 / 1.2 = 17.2$

	x $P/b^2$ y	x $M/b^3$ y	x $P_A$ y	x $Q_A$ y	x $M$ y
L	2.5	0.4 1.0	-	-	-
S	2.7 2.9 2.2 2.1	2.9 2.4	0.10 0.10	2.1 2.1	2.114 <sup>2-D19</sup>

<u>2CA3</u>	x P y	x M y	x Q y
L	15.1	0.2 0.3	1.2 1.5
E	2.1 2.6	2.1 2.1	1.1 1.0
S	17.2 17.7 17.0 17.5	2.4 5.0	2.4 4.3

$b \times D = 2.0 \times 17.5$        $0.6/1.0 = 1.6$        $I_M = 6.019$

	x $P/b^2$ y	x $M/b^3$ y	x $P_A$ y	x $Q_A$ y	x $M$ y
L	7.2	2.6 0.9	-	-	-
S	6.2 6.4 6.2 5.4	5.1 3.2	0.11 0.08	2.3 1.7	2.019 <sup>2-D19</sup>

<u>1CA3</u>	x P y	x M y	x Q y
L	26.9	0.1 0	0.7 0.4
E	4.7 6.0	2.6 3.1	4.2 4.2
S	7.6 7.9 2.2 2.9	2.1 4.2	2.4 2.6

$b \times D = 2.0 \times 7.5$

$w/b = 9.15/1.0 = 9.15$   
 $\beta = 1.10$

	x $P/b^2$ y	x $M/b^3$ y	x $P_A$ y	x $Q_A$ y	x $M$ y
L	14.1	0.2 0.5	-	-	-
S	16.3 17.2 11.6 10.9	2.3 4.4	2.11 0.23	2.3 4.8	2.019 <sup>2-D19</sup>

2CAA	x	P	Y	x	π	Y	x	Q	Y
L		86		0	11	0.6	0	0.5	
E	0.1	17		1.1	43	7.6	0.5	1.8	
S	8.7	103		1.1	5.4		1.0	4.1	
		6.5	6.9						

$b \times D = 20 \times 75$

	x	$P/D$	Y	x	$\pi/D^2$	Y	x	$P_1$	Y	x	$a_1$	Y	x	$\mu$	Y
L		4.1		-	0.0		-	-		-	-		-	-	
S	4.1	4.9	7.3	2.3	3.4		1.0	0.1		2.1	2.1		2.019	2.019	

2CAF	x	P	Y	x	π	Y	x	Q	Y
L		19.2		0	11	1.7	0	0.7	
E	0.5	13.2		2.5	42	7.2	1.3	4.2	
S	19.7	24.4		2.5	4.9		2.6	9.1	
		18.7	14.0						

$b \times D = 20 \times 75$

	x	$P/D$	Y	x	$\pi/D^2$	Y	x	$P_1$	Y	x	$a_1$	Y	x	$\mu$	Y
L		9.1		-	1.1		-	-		-	-		-	-	
S	9.1	11.6	6.7	5.3	6.3		0.09	0.19		1.9	2.9		2.019	2.019	

1CAA	x	P	Y	x	π	Y	x	Q	Y
L		72.1		0	1.2	0.6	0	0.8	
E	1.2	12.9		2.8	13.0	16.5	1.3	6.2	
S	73.3	45.0		2.9	4.7	17.1	2.6	12.0	
		32.9	19.2						

$b \times D = 20 \times 75$

	x	$P/D$	Y	x	$\pi/D^2$	Y	x	$P_1$	Y	x	$a_1$	Y	x	$\mu$	Y
L		16.8		-	0.9		-	-		-	-		-	-	
S	17.5	28.5		0.0	10.0		0.07	0.33		1.5	6.3		2.019	2.019	
		16.2	10.0		13.0								3.019	3.019	

2A	x P Y	x H Y	x Q Y
L	5.9	0.5 0.5	0.3 0.3
E	1.3 1.4	3.7 1.0	1.1 1.1
S	0.7 4.6	3.7 3.0	1.5 2.5

$b \times D = 75 \times 175$        $A = 3410$        $0.25 = 27.3$

	x P/10 Y	x H/10 Y	x P1 Y	x Q1 Y	x M Y
L	1.7	0.3 0.3	-	-	
S	2.1 1.3	2.1 1.3	1.4 2.4	0.1 0.1	3.9 3.9

2B	x P Y	x H Y	x Q Y
L	13.5	0.4 0.4	0.2 0.2
E	4.3 4.1	5.7 4.7	2.7 2.5
S	17.8 9.2	17.6 9.9	6.1 5.7

$b \times D = 75 \times 175$

	x P/10 Y	x H/10 Y	x P1 Y	x Q1 Y	x M Y
L	4.0	0.3 0.3	-	-	
S	5.2 2.7	5.2 2.0	3.9 3.6	0.12 0.1	4.1 3.9

1CB	x P Y	x H Y	x Q Y
L	25.0	0.2 0.1	0.1 0.1
E	9.7 9.3	4.9 22.4	2.8 22.2
S	34.7 15.3	34.3 16.0	8.1 22.3

$b \times D = 75 \times 175$

	x P/10 Y	x H/10 Y	x P1 Y	x Q1 Y	x M Y
L	2.5	0.1 0.1	-	-	
S	10.2 4.5	10.1 4.6	5.2 14.3	0.13 0.12	4.1 17.9



$zCBz$	$x P Y$	$x R Y$	$x Q Y$
L	7.7	0 1.7 0.4	0 0.3
B	0 0.3	1.1 4.0 0.9 2.2	0.5 1.6
S	1.7 4.0 2.4	1.1 4.7	1.0 3.5

$b \times D = 2.8 \times 7.5$

	$x P/10 Y$	$x R/10^2 Y$	$x P/1 Y$	$x Q/1 Y$	$x M Y$
L	3.7	0 0.4	-	-	
B	2.7 3.5 2.5	2.3 3.0	0.1 0.1	2.1 2.1	2.2 2.19

$zCBz$	$x P Y$	$x R Y$	$x Q Y$
L	21.5	0.1 0.3 0.4	0 0.2
B	0 1.2	2.5 2.8 2.3 6.4	1.3 3.7
S	21.5 22.7 20.3	2.6 4.1	2.6 7.6

$b \times D = 2.8 \times 7.5$

	$x P/10 Y$	$x R/10^2 Y$	$x P/1 Y$	$x Q/1 Y$	$x M Y$
L	10.2	0 0.3	-	-	
B	10.2 10.3 9.5	5.5 5.2	0.06 0.17	1.3 1.5	2.2 2.19

$zCBz$	$x P Y$	$x R Y$	$x Q Y$
L	34.4	0.1 0.6 0 0.1	0 0.1
B	0.2 2.4	2.3 11.3 2.4 15.3	1.3 5.8
S	34.4 36.0 25.2 32.0	2.4 16.4	2.6 11.7

$b \times D = 2.8 \times 7.5$

	$x P/10 Y$	$x R/10^2 Y$	$x P/1 Y$	$x Q/1 Y$	$x M Y$
L	13.0	0.2 0.1	-	-	
B	13.1 19.3 17.9 16.7	13.0 11.5	0.05 0.22	1.1 4.6	2.2 2.19

$100A$	$x$	$P$	$Y$	$x$	$\Pi$	$Y$	$x$	$Q$	$Y$
L		11.3		0	21	1.0	0	1.0	
E	0	12		11	5.4	3.0	0.5	2.4	
D	11.3	12.5	10.1	1.1	17.5	1.0	1.0	3.0	

$b \times D = 20 \times 17.5$

	$x$	$\frac{P}{100} Y$	$x$	$\frac{\Pi}{100^2} Y$	$x$	$P$	$Y$	$x$	$Q$	$Y$	$x$	$M$	$Y$
L		5.4		0	1.3								
B	5.4	60	4.0	2.3	4.5	0.1	0.12	2.1	2.5	2-11.9	2-11.9		

$200A$	$x$	$P$	$Y$	$x$	$\Pi$	$Y$	$x$	$Q$	$Y$
L		23.9		0	2.2	1.1	0	1.4	
E	0	4.0		2.5	11.2	4.5	1.3	5.4	
J	23.9	27.9	19.9	2.5	13.4	2.6	2.6	12.2	

$b \times B = 20 \times 17.5$

	$x$	$\frac{P}{100} Y$	$x$	$\frac{\Pi}{100^2} Y$	$x$	$P$	$Y$	$x$	$Q$	$Y$	$x$	$M$	$Y$
L		11.4		0	2.0								
S	11.4	13.3	9.5	5.3	3.6	0.02	0.2	0.9	4.2	2-11.9	2-11.9		

$100B$	$x$	$P$	$Y$	$x$	$\Pi$	$Y$	$x$	$Q$	$Y$
L		20.0		0	2.1	1.1	0	0.7	
E	0	8.6		2.5	15.3	16.5	1.4	12.1	
S	20.0	16.6	19.4	2.7	17.6	2.0	2.0	15.4	

$b \times B = 20 \times 17.5$

	$x$	$\frac{P}{100} Y$	$x$	$\frac{\Pi}{100^2} Y$	$x$	$P$	$Y$	$x$	$Q$	$Y$	$x$	$M$	$Y$
L		19.9		0	1.5								
S	19.9	24.9	16.4	0.7	12.2	13.1	0.05	0.27	1.1	15.7	12.4	2-11.9	2-11.9

2(C1)	x P Y	x R Y	x Q Y
L	9.1	2.6 3.0	1.2 0
E	1.3 1.0	4.2 2.3	1.1 0.9
S	12.4 7.0	10.1 8.1	6.8 1.1

$b \times D = 270 \times 175$

	x P <sub>10</sub> Y	x P <sub>10</sub> <sup>2</sup> Y	x P <sub>1</sub> Y	x Q <sub>1</sub> Y	x R Y
L	4.3	1.7 0	-	-	
S	5.0 3.7	4.8 2.8	4.3 2.3	0.12 0.1	2.5 2.1

2(C1)	x P Y	x R Y	x Q Y
L	20.2	2.0 2.7	1.2 0
E	4.8 2.6	2.8 2.2	2.3 2.3
S	25.0 15.4	22.8 17.6	10.8 2.3

$b \times D = 270 \times 175$

	x P <sub>10</sub> Y	x P <sub>10</sub> <sup>2</sup> Y	x P <sub>1</sub> Y	x Q <sub>1</sub> Y	x R Y
L	9.6	1.7 0	-	-	
S	11.9 7.3	10.9 8.4	6.9 4.9	0.16 0.07	2.4 1.5

1(C1)	x P Y	x R Y	x Q Y
L	32.6	1.9 1.0	0.6 0
E	10.7 6.0	12.0 16.5	2.8 3.4
S	44.3 22.9	31.6 27.6	15.1 17.5

$b \times D = 270 \times 175$

	x P <sub>10</sub> Y	x P <sub>10</sub> <sup>2</sup> Y	x P <sub>1</sub> Y	x Q <sub>1</sub> Y	x R Y
L	17.6	1.7 0	-	-	
S	22.2 11.9	22.8 19.9	9.7 12.3	9.0	2.1 0.1

$2C(3)$	$x$	$P$	$Y$	$x$	$R$	$Y$	$x$	$Q$	$Y$
L		11.5		0.7	0	0	0.3	0	
E	0.8	0.7		5.3	11	0.9	2.3	0.5	
S	12.3	12.2		6.0	11		4.9	1.0	
		10.7	10.8						

$b \times D = 2.0 \times 7.5$

	$x$	$P/bD$	$Y$	$x$	$R/bD$	$Y$	$x$	$P/b$	$Y$	$x$	$Q/b$	$Y$
L		4.5		0.5	0		-	-				
S	5.9	5.6		3.8	2.3		0.1	0.1	2.1	2.1	2-D19	2-D19
		5.1	5.1									

$2C(3)$	$x$	$P$	$Y$	$x$	$R$	$Y$	$x$	$Q$	$Y$
L		27.3		11	0	0	0.6	0	
E	2.7	2.3		12.0	2.3	2.3	5.7	1.2	
S	22.0	29.6		13.1	2.3		12.0	2.4	
		24.6	25.0						

$b \times D = 2.0 \times 7.5$

	$x$	$P/bD$	$Y$	$x$	$R/bD$	$Y$	$x$	$P/b$	$Y$	$x$	$Q/b$	$Y$
L		13.0		0.6	0		-	-				
S	14.3	17.1		6.4	4.9		0.15	-	2.2	2.2	2-D19	2-D19
		11.7	11.9									

$1C(3)$	$x$	$P$	$Y$	$x$	$R$	$Y$	$x$	$Q$	$Y$
L		45.2		0.8	0	0	0.3	0	
E	6.1	5.3		14.7	2.3	2.9	7.1	1.3	
S	52.3	50.5		14.0	2.4		14.5	2.6	
		22.1	29.9						

$b \times D = 2.0 \times 7.5$

	$x$	$P/bD$	$Y$	$x$	$R/bD$	$Y$	$x$	$P/b$	$Y$	$x$	$Q/b$	$Y$
L		23.7		0.6	0		-	-				
S	28.9	28.4		11.2	2.0		0.19	-	4.0	4.0	2-D19	2-D19
		20.5	20.9		13.3	2.0	0.31	-	6.5	6.5	3-D19	2-D19

CEI	x P Y	x M Y	x Q Y
L	5.7	0.5 0.5	0 0
E	1.2	2.7 1.2	1.1 0.9
S	6.5 0.1	5.7	3.2 1.1

$b \times D = 2.0 \times 7.5$

	x P/100 Y	x M/100 Y	x P <sub>A</sub> Y	x A <sub>1</sub> Y	x M Y
L	2.3	0.3	0	-	-
S	1.1 1.9	2.3	2.0	2.3	0.1 0.1

CEI	x P Y	x M Y	x Q Y
L	13.2	0.4 0.5	0 0
E	9.2	5.5 4.3	2.3 2.0
S	19.4 9.0	13.3 13.2	5.9 2.3

$b \times D = 2.2 \times 7.5$

	x P/100 Y	x M/100 Y	x P <sub>A</sub> Y	x A <sub>1</sub> Y	x M Y
L	6.3 8.3	0.3	0	-	-
S	4.3 6.3 6.2	3.8	4.9	0.03 0.1	1.7 2.1

CEI	x P Y	x M Y	x Q Y
L	29.4	0.3 0.1	0 0
E	9.3	2.4 14.9	2.8 3.4
S	33.7 15.1	24.7 24.1	15.0 3.4

$b \times D = 2.8 \times 7.5$

	x P/100 Y	x M/100 Y	x P <sub>A</sub> Y	x A <sub>1</sub> Y	x M Y
L	12.6	0.1	0	-	-
S	1.7 2.9	12.9 12.6	10.5 8.0	0.31 0.12	6.5 2.5

	x P Y	x M Y	x Q Y
L	10.2	0 0.1	0 0
E	0 0.1	11.9 2.4	0.5 1.7
S	10.2 10.3 10.1	1.1 4.2	1.0 3.4

b x D = 2.0 x 7.5

	x P/100 Y	x H/100 Y	x PA Y	x DA Y	x M Y
L	4.9	0 0.1	- -		
S	4.9 4.9 4.8	2.3 2.7	0.1 0.1	2.1 2.1	2-D19 2-D19

	x P Y	x M Y	x Q Y
L	24.7	0 0.1 0 0.1	0 0.1
E	0 0.5	2.5 2.5 2.5 6.9	1.3 6.0
S	24.7 25.2 24.2	2.5 4.5	2.6 6.1

b x D = 2.0 x 7.5

	x P/100 Y	x H/100 Y	x PA Y	x DA Y	x M Y
L	11.2	0 0.1	- -		
S	11.2 12.0 11.5	5.3 5.6	0.03 0.05	0.6 1.1	2-D19 2-D19

	x P Y	x M Y	x Q Y
L	29.3	0 0.1 0 0	0 0
E	0 1.1	2.8 2.4 12.0 16.6	1.3 6.0
S	29.3 42.4 36.2	2.4 16.6	2.6 12.0

b x D = 2.0 x 7.5

	x P/100 Y	x H/100 Y	x PA Y	x DA Y	x M Y
L	20.6	0 0.1	- -		
S	20.6 21.2 20.0	8.0 11.6	- 0.04 0.03	0.8 1.4	2-D19 2-D19 T 2-D19 B 2-D19

2004	x P Y	x H Y	x Q Y
L	93	0 53	0 25
E	0 0.7	11 2.9	0.5 1.5
D	93 12.0 9.6	1.1 2.0	1.0 4.9

$b \times D = 20 \times 115$

	x P/Y	x H/Y	x PA Y	x A1 Y	x H Y
L	4.4	0 3.4	- 0.10		
D	4.4 4.6 4.1	2.7 6.5	0.1 0.15	2.1 3.2	2-D19 2-D19

2004	x P Y	x H Y	x Q Y
L	20.4	0 4.7	0 2.7
E	0 2.4	2.5 6.5	1.3 3.1
D	20.4 22.0 24.0	2.5 11.2	2.6 9.9

$b \times D = 20 \times 115$

	x P/Y	x H/Y	x PA Y	x A1 Y	x H Y
L	14.5	0 3.6	- -		
S	14.5 15.6 13.7	4.7 7.1	- 0.03	1.7	2-D19 2-D19

1004	x P Y	x H Y	x Q Y
L	51.9	0 7.6	0 1.1
E	0 5.5	3.0 11.6	1.4 5.3
D	51.9 50.4 47.4	3.5 17.2	2.0 11.7

$b \times D = 20 \times 115$

	x P/Y	x H/Y	x PA Y	x A1 Y	x H Y
L	27.5	0 2.5	- -		
S	27.5 33.5 24.3	2.7 10.6	- 0.11	4.4	2-D19 2-D19

$zCFI$	$x P Y$	$x M Y$	$x Q Y$
L	2.4	1.1 1.0	0 0
B	0.9 0	2.3 1.0	1.1 2.4
D	4.3 2.5	3.4	1.1 2.4

$b \times b = 2.4 \times 1.1$

	$x P/b Y$	$x M/b^2 Y$	$x PA Y$	$x QA Y$	$x M Y$
L	1.6	0.7 0	-	-	
D	3.0 1.2	1.6	2.5 2.3	0.1 0.1	2.1 2.1

$zCFI$	$x P Y$	$x M Y$	$x Q Y$
L	2.7	0.2 0	0.1 0
B	3.5 0	7.4 2.3	2.0 1.2
D	12.2 5.2	0.7	0.6 2.3

$b \times b = 2.4 \times 1.1$

	$x P/b Y$	$x M/b^2 Y$	$x PA Y$	$x QA Y$	$x M Y$
L	4.1	0.1 0	-	-	
B	5.8 2.5	4.1	4.9 4.9	0.16 0.13	2.4 2.7

$ICFI$	$x P Y$	$x M Y$	$x Q Y$
L	14.3	0.1 0	0.1 0
F	2.5 0	9.7 2.6	2.0 1.3
J	17.0 10.0	14.3	9.8 3.4

$b \times b = 2.8 \times 1.1$

	$x P/b Y$	$x M/b^2 Y$	$x PA Y$	$x QA Y$	$x M Y$
L	7.5	0.1 0	-	-	
B	9.3 5.6	7.5	6.9 8.0	0.20 0.21	4.2 4.4

$\mathcal{L}(F)$	$\times P$	$\times M$	$\times Q$
L	7.4	1.1 0 0.35 0	0.4 0
E	0.7 0.6	5.0 1.1 2.1 2.9	2.1 0.5
S	0.1 0.0 6.7 6.0	6.1 1.1	4.6 1.0

$b \times b = 2.0 \times 1.5$

	$\times P_{10}$	$\times M_{10}$	$\times P_A$	$\times Q_A$	$\times M$
L	3.5	0.7 0	-	-	
S	2.1 3.3 3.2 3.2	3.9 2.3	0.12 0.1	2.5 2.1	2-D19 2-D19

$\mathcal{L}(F)$	$\times P$	$\times M$	$\times Q$
L	16.0	0.2 0 0.1 0	0.1 0
E	2.1 2.1	10.5 2.3 2.0 2.3	4.6 1.2
S	1.9 1.8 1.7 1.7	10.7 2.3	9.3 2.4

$b \times b = 2.0 \times 1.5$

	$\times P_{10}$	$\times M_{10}$	$\times P_A$	$\times Q_A$	$\times M$
L	0.0	0.1 0	-	-	
S	4.5 9.0 6.5 7.0	6.0 4.9	0.17 0.08	2.6 1.7	2-D19 2-D19

$\mathcal{L}(F)$	$\times P$	$\times M$	$\times Q$
L	21.1	0.1 0 0 0	0 0
E	1.1 4.0	1.7 2.0 16.2 2.4	5.0 1.3
S	4.2 3.1 12.0 22.3	11.4 2.4	11.6 2.6

$b \times b = 2.0 \times 1.5$

	$\times P_{10}$	$\times M_{10}$	$\times P_A$	$\times Q_A$	$\times M$
L	14.2	0.1 0	-	-	
S	2.6 18.7 6.0 11.7	8.0 8.0	0.22 0.13 0.36 0.13	4.6 2.7	2-D19 2-D19 3-D19 3-D19

2CF4	x P Y	x R Y	x Q Y
L	9.4	0.1 0	0 0
E	1.2 0	0.6 0.3 1.4 1.3	0.2 0.2
S	10.6 4.4 0.2	0.5 0.9	0.4 0.4

$b \times b = 2b \times 2b \quad 0.9d_1 = 6.7$

	x P/OD Y	x R/OD Y	x PA Y	x DA Y	x M Y
L	12.1	0.6 0	-	-	
S	13.5 10.5 12.1	2.1 2.8	-	-	2-b19 2-b19

2CF4	x P Y	x R Y	x Q Y
L	19.4	0 0	0 0
E	6.2 0.3	1.0 1.0 1.0 1.0	0.5 0.5
S	25.6 19.0 13.2 14.1	1.0 1.0	1.0 1.0

$b \times b = 2b \times 2b$

	x P/OD Y	x R/OD Y	x PA Y	x DA Y	x M Y
L	24.9	0 0	-	-	
S	32.8 25.3 16.9 24.5	6.2 6.2	-	-	2-b19 2-b19

1CF4	x P Y	x R Y	x Q Y
L	29.8	0 0	0 0
E	17.2 0.5	1.1 1.3 1.3 1.3	0.5 0.5
S	47.0 30.6 12.6 29.0	1.3 1.3	1.0 1.0

$b \times b = 2b \times 2b$

	x P/OD Y	x R/OD Y	x PA Y	x DA Y	x M Y
L	42.1	0 0	-	-	
S	66.0 43.2 19.7 42.9	8.1 8.1	0.5	0.6	2-b19 2-b19

3CFU	x P Y	x M Y	x Q Y
L	0.9	1.6 0.2	0.5 0
E	0.5 0.6	4.7 2.6	1.1 0.9
S	9.4 4.4	9.5 0.3	6.3 1.1

b x b = 20 x 115

	x P/bD Y	x M/bD <sup>2</sup> Y	x P <sub>1</sub> Y	x A <sub>1</sub> Y	x M Y
L	9.2	1.0	0	-	-
S	4.5 4.0	4.5 2.9	4.0	2.3	0.10 0.1

2.1 2.1 2.019 2.019

2CFU	x P Y	x M Y	x Q Y
L	14.6	0.1 0.6	0.2 0
E	1.9 2.1	9.1 3.9	2.3 2.7
S	16.5 12.0	16.7 12.8	4.2 2.7

b x b = 20 x 75

	x P/bD Y	x M/bD <sup>2</sup> Y	x P <sub>1</sub> Y	x A <sub>1</sub> Y	x M Y
L	7.0	0.4	0	-	-
S	7.9 6.0	8.0 5.9	5.9	4.9	0.14 0.10

3.0 2.1 2.019 2.019

1CFU	x P Y	x M Y	x Q Y
L	21.7	1.5 0.3	0.2 0
E	5.6 4.6	6.9 15.0	2.3 3.4
S	27.3 16.1	26.5 15.3	7.4 2.6

b x b = 20 x 115

	x P/bD Y	x M/bD <sup>2</sup> Y	x P <sub>1</sub> Y	x A <sub>1</sub> Y	x M Y
L	11.4	0.4	0	-	-
S	14.7 8.4	13.9 8.9	8.6 10.7	2.0	0.05 0.30

1.1 1.3 2.0 2.0 2.019 2.019 2.019 2.019

2C43	x P Y	x R Y	x Q Y
L	6.0	0 0	0 0
E	0.5 0	0.4 0.4	0.2 0.2
S	2.3 6.3	0.4 0.4	0.4 0.4

$b \times D = 2.0 \times 2.0$

	x P/Y	x R/Y	x P/Y	x Q/Y	x R/Y
L	0.7	0 0	-	-	
S	0.9 0.1 0.7	1.3 1.3	-	-	2.0 2.0

2C43	x P Y	x R Y	x Q Y
L	17.9	0 0	0.1 0
E	1.5 0	1.0 1.0	0.5 0.5
S	19.4 17.9	1.2 1.0	1.1 1.0

$b \times D = 2.0 \times 2.0$

	x P/Y	x R/Y	x P/Y	x Q/Y	x R/Y
L	23.0	1.1 0	-	-	
S	24.9 21.0 23.0	6.3 5.7	-	-	2.0 2.0

1C43	x P Y	x R Y	x Q Y
L	29.4	0 0	0 0
E	2.3 0	1.1 1.3	0.5 0.5
S	32.7 29.4	1.3 1.3	1.0 1.0

$b \times D = 2.0 \times 2.0$

	x P/Y	x R/Y	x P/Y	x Q/Y	x R/Y
L	41.5	0 0	-	-	
S	46.1 41.5	8.1 8.1	-	-	2.0 2.0

z Cas	x P Y	x R Y	x Q Y
L	4.0	0.1 0	0.1 0
E	0.9 0	1.1 0.9	0.5 0.5
S	9.7 2.9	1.2 1.1	1.1 1.0

$b \times D = 4.0 \text{ \$}$

$0.9 \times 10 = 9.0$   
 $x = 4.0 \times 0.9 / 4.0 = 0.9$

	x P/Y	x R/Y	x P/Y	x Q/Y	n
L	5.5	0.2 0	-	-	
S	6.1 4.9	2.0 1.8	0.03	0.9	12-D13

z Cas	x P Y	x R Y	x Q Y
L	17.8	0.1 0	0.1 0
E	4.0 0	2.1 2.3	1.1 1.2
S	21.6 13.2	2.2 2.3	2.3 2.4

$b \times D = 4.0 \text{ \$}$

	x P/Y	x R/Y	x P/Y	x Q/Y	n
L	11.1	0.2 0	-	-	
S	12.6 8.5	3.7 3.8	0.17	0.9	12-D13

z Cas	x P Y	x R Y	x Q Y
L	21.5	0.1 0	0 0
E	10.3 0	2.4 2.5	1.1 1.2
S	22.6 17.2	2.9 3.2	2.2 2.4

$b \times D = 4.0 \text{ \$}$

	x P/Y	x R/Y	x P/Y	x Q/Y	n
L	17.2	0.2 0	-	-	
S	22.7 10.8	5.3 5.9	0.15 0.10	1.9 1.3	12-D13

3CH <sup>2</sup>	x P Y	x M Y	x Q Y	
L	9.9	0.2 0.2	0 0	0.1 0
E	0.9 0	0.4 0.3	0.4 0.3	0.2 0.2
S	10.3 8.5	9.9	0.6 0.4	0.5 0.4

$b \times D = 2B \times 2B$

	x P/10 Y	x M/10 <sup>2</sup> Y	x P <sub>1</sub> Y	x Q <sub>1</sub> Y	x M <sub>1</sub> Y
L	100	1.1 0	-	-	
S	13.2 10.9	13.0	3.4 2.3	-	-

z-D19 z-D19

2CH <sup>4</sup>	x P Y	x M Y	x Q Y	
L	20.7	0.4 0.4	0 0	0.2 0
E	3.3 0.3	1.0 1.0	1.0 1.0	0.5 0.5
S	24.0 17.4	21.0 20.4	1.4 1.0	1.2 1.0

$b \times D = 2B \times 2B$

	x P/10 Y	x M/10 <sup>2</sup> Y	x P <sub>1</sub> Y	x Q <sub>1</sub> Y	x M <sub>1</sub> Y
L	26.5	2.3 0	-	-	
S	30.8 22.3	27.0 26.1	5.4 4.1	-	-

z-D19 z-D19

1CH <sup>4</sup>	x P Y	x M Y	x Q Y	
L	32.4	0.2 0.1	0 0	0.1 0
E	4.0 0.6	1.3 1.6	1.1 1.3	0.6 0.5
S	41.4 23.4	33.0 31.8	1.7 1.3	1.3 1.0

$b \times D = 2B \times 2B$

	x P/10 Y	x M/10 <sup>2</sup> Y	x P <sub>1</sub> Y	x Q <sub>1</sub> Y	x M <sub>1</sub> Y
L	45.7	1.2 0	-	-	
S	58.4 33.0	46.4 44.9	10.6 8.1	0.4 -	0.4

z-D19 z-D19

	$x$	$P$	$Y$	$x$	$\pi$	$Y$	$x$	$Q$	$Y$
L		14.3		0.3	1.7	0	0.1	0	
E	FD	0		2.2	10.2	2.0	3.4	1.9	1.3
S	13.3 10.3	15.3		10.4	3.2	3.9	2.6		

$$\frac{w}{b} = \frac{5.75}{2.3}$$

$$= 2.5$$

$$w = 1.30$$

$b \times D = 2.0 \times 17.5$

	$x$	$P/D$	$Y$	$x$	$\pi/D^2$	$Y$	$x$	$P_A$	$Y$	$x$	$Q_A$	$Y$	$x$	$M$	$Y$
L		8.9		0.2	0										
S	11.3 10	8.9		3.6	9.9	0.25	0.25	5.3	5.3	2.019	2.019				

(\*) SLAB

$w_r = 0.56$

$w_n = 0.66$

9.  $l_x = 2.47$      $\gamma = 1.0$

$\rho_{x1} = 0.042 \times W \times 2.47^2 = 0.34W$     0.19    0.22

$\rho_{x2} = 0.028 \times \text{"} = 0.22W$     0.12    0.15

$D = 10$      $\lambda = 17$      $j = 6.1$

$A_{x1} = 1.4$      $D = 20 \text{ @}$

$A_{x2} = 1.2$      $D = 30 \text{ @}$

55.  $l = 180$      $w = 0.60 + 2.50 = 900 \text{ kg/m}^2$

$\rho_0 = 0.90 \times 1.8^2 / 10 = 0.36$

$D = 26$      $\lambda = 21$      $j = 12.3$

$A = 36 / 12.3 \times 2.0 = 0.96$      $D = 30 \text{ @}$

6.  $l = 4.49$      $w' = 0.90 \times 1.8^2 + 0.51 = 1.32$

$\rho_0 = 1.32 \times 4.49^2 / 10 = 11.9$

$D = \text{"} \times 4.49^2 = 5.6$

$b \times D = 26 \times 12.5$      $j' = 61.2$

$\rho_3 = 5.6 / 26 \times 61.2 = 3.3 \leq 6.0$

$\rho_3 = 5.6 / 61.2 \times 12 = 11.6$

$A = 11.9 / 0.612 \times 2.0 = 9.7$      $F = D 19$

(4) FOOTING

$f_p f_{09} = 35^T$

$w = 1.2 \times 1.2 \times 0.15 \times 2.4 = 2.6^T$  }  $35 - 2.6 = 32^T$

	P	WALL	TIE DASH	ZP	g x n	l x l'
A3	26.9	0.49 x 1.20 2.16 x 1.91	0.50 4.19	2.32	34.5	409 x 2 120 x 240
A4	32.1	0.49 x 2.55	1.25	3.84	37.2	"
B1	25.0	0.49 x 2.55	1.25	2.15	29.4	"
B2	35.9	0.49 x 2.55	1.25	5.30	42.5	"
B3	34.4	0.49 x 1.20 2.16 x 1.91 1.84 x 1.24	1.50 4.13 2.35	4.66	45.6	409 x 3 120 x 360
B4	34.0			7.11	45.1	"
C1	32.6	0.49 x 2.55	1.25	4.30	39.2	409 x 2 120 x 240
C2	45.2	1.44 x 2.55	4.69	7.53	57.4	409 x 4 240 x 240
E1	24.4	0.49 x 2.55	1.25	3.23	28.9	409 x 2 120 x 240
F2	39.3	0.49 x 1.20 1.84 x 1.26	1.60 2.35	4.30	46.6	409 x 3 120 x 360
E4	52.9	1.04 x 2.55	4.19	7.36	63.0	409 x 4 240 x 240
F1	14.3			4.30	18.6	409 x 1 120 x 120
F2	27.1	0.49 x 2.55	1.25	5.44	33.8	409 x 2 120 x 240
F4	29.8	1.04 x 2.55	4.69	6.03	39.9	"
F6	21.7	0.49 x 2.55	1.25	6.33	29.8	"
G2	29.5	2.16 x 2.55 1.84 x 1.24	5.31 2.35	5.46	42.7	"
G5	27.5			6.82	34.3	"
H4	32.4	1.84 x 2.55	4.16	5.30	41.9	"

$$F_1 \quad 40 \text{ kg} \times 1 \quad 120 \times 120 \quad D = 75 \quad \rho' = 59.5$$

$$u = 5 - 0.16$$

$$F_2 \quad 40 \text{ kg} \times 2 \quad 120 \times 240$$

$$\Gamma_p = 42.0 / 2 = 21.0 = \rho$$

$$\rho_b = 21.0 \times 10^3 / 120 \times 59.5 = 3.0 < 5$$

$$\rho_s = 21.0 \times 10^3 / 59.5 \times 15 = 24.0$$

$$\rho_a = 21.0 \times 60 / 59.5 \times 2.0 = 10.8 \quad \left. \vphantom{\rho_a} \right\} \text{b-016}$$

$$F_3 \quad 40 \text{ kg} \times 3 \quad 120 \times 360$$

$$\rho_p = 46.6 / 3 = 15.5$$

$$\rho_b = 15.5 \times 10^3 / 59.5 \times 15 = 17.4$$

$$\rho_a = 15.5 \times 120 / 59.5 \times 2.0 = 15.6 \quad \left. \vphantom{\rho_a} \right\} \text{b-019}$$

$$F_4 \quad 40 \text{ kg} \times 4 \quad 240 \times 240$$

$$\rho_p = 67.0 / 4 = 16.8$$

$$\rho_b = 16.8 \times 2 \times 10^3 / 150 \times 59.5 = 3.5$$

$$\rho_s = \quad \quad \quad / 59.5 \times 15 = 35.4$$

$$\rho_a = 16.8 \times 2 \times 60 / 59.5 \times 2.0 = 15.9 \quad \left. \vphantom{\rho_a} \right\} \text{b-019}$$

(G.) THE BEAM

$b \times d = 35 \times 90$

$w = 0.76$

FGD IN

$i = 72.6$

$R_{OE} = 22.4 + 0.1 = 22.5$

$R_{IE} = 1.9 + 0 = 1.9$

$w' = 0.76 + 0.49 = 1.25 \text{ ft}$

$C = 1.25 \times 220^2 / 12 = 0.973$

$R_{CE} = \dots / d = 1.25$

$R_{IE} = 1.2 C = 1.0$

$\Sigma R_{IE} = 1.9 + 1.0 = 2.9$

$A_{DE} = 22.5 / (0.76 \times 70) = 10.3$

4-D19

$A_{IE} = 2.9 / \dots = 1.7$

2-D19

FGA IN

$R_{OE} = 3.1 + 0 = 3.1$

$\Sigma R_{IE} = 1.7 + 0 + 1.0 = 2.7$

$A = 3.1 / (0.76 \times 70) = 1.4$

2-D19

FGC IN

$R_{OE} = 16.5 + 1.0 = 17.5$

$R_{IE} = 11.1 + 0.2 = 11.3$

$w' = 0.76 \quad l = 566$

$l = 249$

$C = 0.76 \times 566^2 / 12 = 2.0$

$0.76 \times 249^2 / 12 = 4.6$

$R_{CE} = \dots / d = 2.0$

$\dots / d = 6.6$

$$\begin{array}{r} 0.76 \times 0.49 \\ 0.37 \quad 0.47 \\ + 2.0 - 4.6 \\ + 0.8 + 0.6 \end{array}$$



$\Sigma R_{IE} = 11.3 + 3.8 = 15.1$

$$Q_{DE} = 17.5 / 0.726 \times 3.0 = 9.0 \quad 4-D19$$

$$Q_{TE} = 15.1 / \quad \quad = 6.9 \quad 4-D19$$

$$Q_C = 3.0 / 0.726 \times 2.0 = 2.1 \quad 2-D19$$

FG F1W

$$R_{OE} = 9.0 + 0.1 = 9.1$$

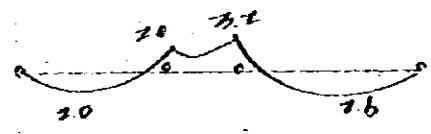
$$R_{TE} = 12.2 + 0 = 12.2$$

$$w' = 0.76 \quad l = 126 \quad I = 663$$

$$C = 0.76 \times 1.46^3 / 12 = 0.12 \quad 0.76 \times 1.66^3 / 12 = 2.8$$

$$R_{O} = \quad \quad / b = 0.3 \quad \quad \quad / b = 4.2$$

0	1.2	0.426	0	0.65	0
0.20	0.80	0.33	0.17		
+30	-0.3	+0.2	-4.2		
-0.5	-2.2	+2.3	+0.1		
	+1.2	-1.1			
-0.3	-1.3	+0.4	+1.2		
	+2.4	-0.6			
-0.1	-2.2	+0.5	+0.1		



$$Z_{HTE} = 12.2 + 3.2 = 15.4$$

$$Q_{DE} = 9.1 / 0.726 \times 3.0 = 9.6 \quad 2-D19$$

$$Q_{SE} = 15.4 / \quad \quad = 12.1 \quad 4-D19$$

FG 1 BN

$$R_{OE} = 4-D19$$

$$R_{TE} = 2-D19$$

FG 2 DE

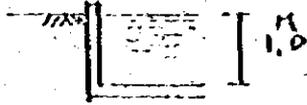
$$R_{TE} = 15.4 + 1.8 = 17.2$$

$$R_{O} = 0.76 \times 2.49^2 / 8 = 6.8$$

$$Q_{DE} = 17.2 / 0.726 \times 3.0 = 7.9 \quad 4-D19$$

$$Q_C = 6.8 / 0.726 \times 2.0 = 4.7 \quad 2-D19$$



(6.7) POND

$$w = 1.0 \text{ T/m}^2$$

$$I_z = 1.0 \times 1.0 / 2 < 1.0 / 3 = 0.167 \text{ T-m} / \text{m}$$

$$D = 15 \quad d = 10 \quad \rho' = 0.1$$

$$a = 167 / 0.1 \times 2.0 = 1.0 \quad \text{D10 } 20 \text{ @}$$

$$\text{SLAB} \quad l_x = 2.83 \quad l_y = 5.66 \quad \gamma = 2.0 \quad w = 1.00 \times 0.42 = 1.42$$

$$M_{x1} = 0.078 \times 1.42 \times 2.83^2 = 0.39$$

$$M_{x2} = 0.052 \times \quad \quad \quad = 0.59$$

$$M_{y1} = 0.062 \times \quad \quad \quad = 0.48$$

$$M_{y2} = 0.078 \times \quad \quad \quad = 0.32$$

$$D = 15 \quad d = 10$$

$$a_{x1} = 1.1 \quad \text{D10 } 10 \text{ @}$$

$$a_{x2} = 3.4 \quad \text{D10 } 20 \text{ @}$$

$$a_{y1} = 2.8 \quad \text{D10 } 20 \text{ @}$$

$$a_{y2} = 1.8 \quad \quad \quad "$$

(2) PORCH ROOF

STEEL FOLDED PLATE BEAM } 15 } 150 kg/m<sup>2</sup>  
 25 }

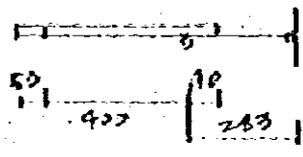
WIND H = 400

$S = 60\sqrt{4.0} = 120 \text{ kg/m}^2$

$C = 2.0$

$W = -120 \times 2.0 = -240 \text{ kg/m}^2$

$S(W+S) = -240 + 150 = -90$



$B_1 \quad l = 2.9$

$W = 190 \times 2.9 = 551 \text{ kg/m}$

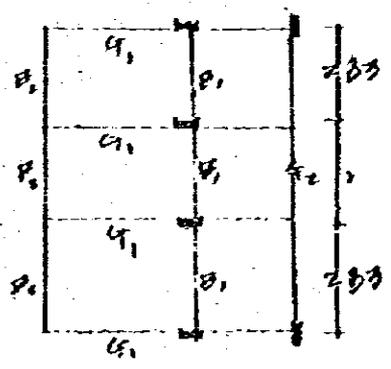
$\eta_0 = 0.55 \times 2.9^2 / 10 = 0.55 \text{ T-m}$

$\theta = 1.55 \times 2.9 / 12 = 0.78 \text{ T}$

$L = 310 \times 100 \times 10.5 \times 16$

$\lambda_b = 900 / (2.9 \times 36 / (16 \times 10)) = 1.34$

$\sigma_b = 55 / 1162 = 0.072 < 1.34 \times 1.5 = 2.01$



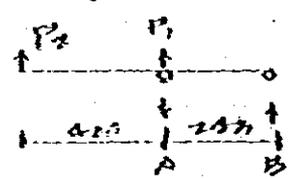
$B_1 \quad l = 2.9 \quad W = 190 \times 2.5 = 475$

$\eta_0 = 0.475 \times 2.9^2 / 10 = 0.41$

$\theta = 0.475 \times 2.9 / 12 = 0.67$

$L = 310 \times 100 \times 10.5 \times 16 \quad \text{OK.}$

$G_1$



$P_1 = 0.551 \times 2 = 1.10$

$P_2 = 0.108 \times 2 = 0.95$

$R_D = 0.95 \times 4.0 / 2.9 = 1.29 \text{ T}$

$$R_A = 0.9k \cdot 11.10 + 1.34 = 7.39$$

$$R_A = 0.9k \times 4.0 = 3.60 \text{ T-H}$$

$$I = 300 \times 100 \times 10^4 \times 16 \quad z_x = 1762$$

$$f_b = 900 / 400 \times 23 / 1.0 \times 10 = 0.447$$

$$\sigma_b = 300 / 1762 = 0.499 < 0.447 \times 1.5 = 1.42$$

$$\delta = 950 \times 400^3 / 3 \times 2.1 \times 10^6 \times 14500 = 0.67 \neq 400 / 600$$

42



$$Q = 0.447$$

$$P = 1.34 \text{ T}$$

$$R = 1.34 \times 2.83 = 3.79 \text{ T-H}$$

$$Q = 1.34 \text{ T}$$

$$I = 300 \times 100 \times 10^4 \times 16$$

$$f_b = 1.34$$

$$\sigma_b = 379 / 1762 = 0.499 < 1.34 \times 1.5 = 2.01$$

$$\delta = 1.340 \times 400^3 \times 23 / 400 \times 2.1 \times 10^6 \times 14500 = 0.956 \neq 400 / 600$$

$$f_b = 1.34 / 24.0 \times 1.05 = 0.079 < 0.9 \times 1.5 = 1.32$$

2 教 室 棟

CLASSROOM & OFFICE BUILDING

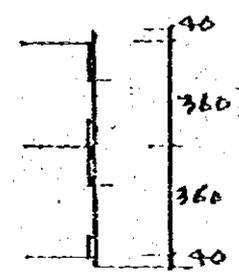
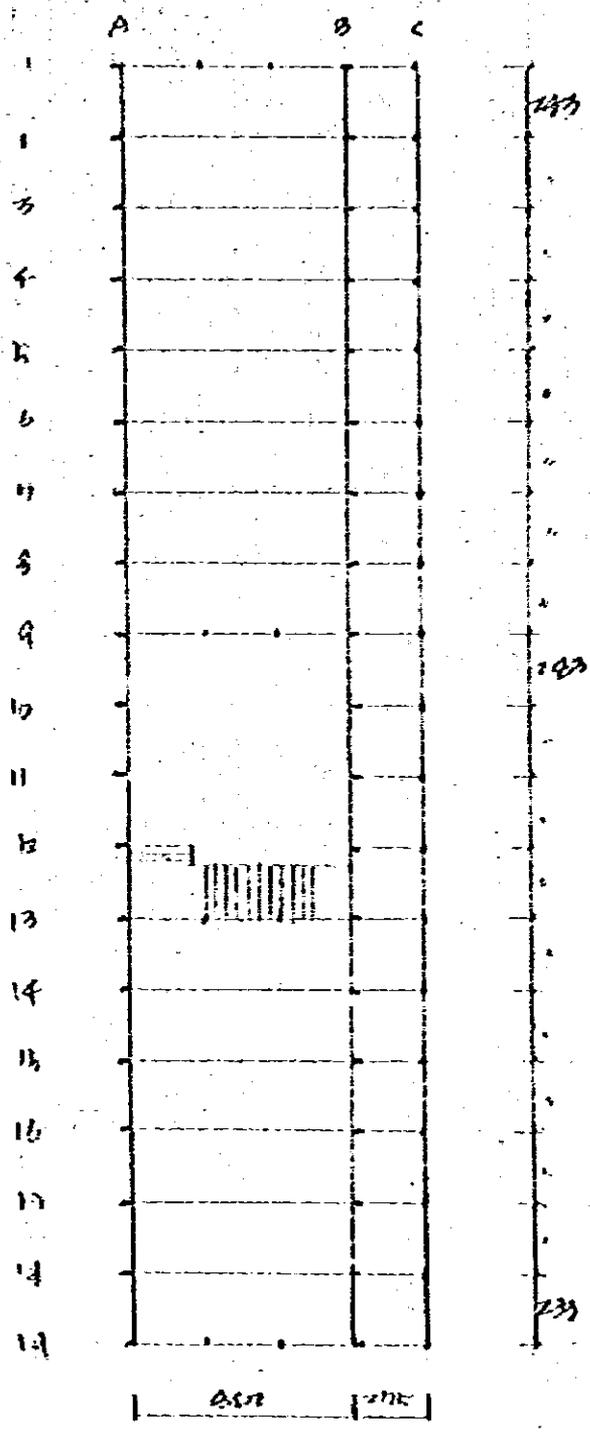
2-1. LOAD

(i) DEAD LOAD

ROOF	LIKE CONCRETE	10 cm	200	} 460 <sup>kg/m<sup>2</sup></sup>
	RC SLAB	10 "	240	
	CEILING		20	
FLOOR	TERAZZO TILE	5	100	} 360 "
	RC SLAB	10	240	
	CEILING		20	
WALL	BRICK	25.4	490	} 540
	CEMENT MORTAR	2.5	50	
BEAM	28x50	340	<sup>kg/m</sup>	
	28x75	510	"	
COLUMN	28x75	510	"	
	28x45	300	"	
	28x30	190	"	

(ii) LIVE LOAD

	SLAB	FRAME	EARTHQUAKE
FLOOR	300	210	110
ROOF	100	50	0
LIBRARY	500	450	400



2-2. C.P.O. OF BEAM

G A 12   $l_x = 243 \quad \lambda = 1.0$

$C = 0.60W + 0.67W'$   
 $P_0 = 1.0W + 1.00W'$   
 $Q = 1.05W + 1.42W'$

$w_R = 0.61$	$w_2 = 0.57$		
$w'_R = 0.66$	$w'_2 = 0.97$		
0.7	1.0	0.5	1.1
1.1	1.5	0.8	1.9
1.4	2.0	1.2	2.2

G B 12   $l_x = 243 \quad \lambda = 1.0$

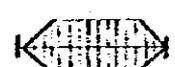
$C = 1.2W + 0.67W'$   
 $P_0 = 2.0W + 1.0W'$   
 $Q = 2.1W + 1.42W'$

$w'_R = 1.39$	$w'_2 = 1.64$		
0.8	1.4	0.6	1.5
1.4	2.8	0.9	2.9
1.6	3.5	1.1	2.7

G C 12   $l_x = 275 \quad l_y = 233 \quad \lambda = 1.03$

$C = 0.6W + 0.67W'$   
 $P_0 = 1.0W + 1.0W'$   
 $Q = 1.05W + 1.42W'$

$w'_R = 0.86$	$w'_2 = 0.62$		
0.6	0.7		
1.2	1.1		
1.2	1.3		

G 2 A B   $l_x = 283 \quad l_y = 442 \quad \lambda = 2.99$

$C = 8.1 \times 2W + 5.11W'$   
 $P_0 = 12.3 \times 2W + 0.36W'$   
 $Q = 5.1 \times 2W + 4.21W'$

$w'_R = 0.51$	$w'_2 = 0.61$	$(1.970)$	
11.3	12.9	(20.2)	16.1
17.0	18.8	(22.4)	24.5
7.4	9.1	(13.6)	10.4

G 2 B C   $l_x = 275 \quad \lambda = 1.0$

$C = 0.85 \times 2W + 0.32W'$   
 $P_0 = 0.9 \times 2W + 0.95W'$   
 $Q = 0.95 \times 2W + 1.22W'$

$w'_R = 0.37$			
0.8	0.9		
1.2	1.4		
1.4	1.6		

2-3 AXIAL FORCE OF COLUMN

	ROOF & FLOOR		WALL		RAIL	COLUMN	W.	P
2CA1	0.51 x 1.42 x 1.41	1.02	0.10 x 2.40 0.47 x 1.77	0.26 0.88	0.97	0.92	4.07	4.1
1C.	0.57 x "	1.14	0.83 x 1.27 1.67 x 1.17 0.10 x 2.40	1.05 1.45 0.26	0.97	2.96	3.85	13.0
2CA2	0.51 x 2.43 x 4.21	6.08	0.47 x 2.55	1.46	2.43	0.92	11.67	11.7
1C.	0.57 x "	6.74	0.83 x 2.55	2.12	2.43	2.96	16.26	27.9
2CA3	0.51 x 2.43 x 4.21	6.08	0.10 x 2.40 1.77 x 2.55	0.26 1.46	2.43	0.92	12.54	12.5
1C.	0.57 x "	6.74	1.31 x 4.27 0.83 x 2.55	5.33 2.12	2.43	2.96	21.54	24.1
2CA4	0.51 x 2.43 x 4.21	6.08	0.10 x 2.40 0.47 x 2.55	0.26 1.46	2.43	0.92	11.65	11.4
1C.	0.57 x 1.42 x 4.21	3.91	1.31 x 4.27 0.83 x 2.55	5.33 2.12	2.43	2.96	14.21	29.7
2CA11	0.51 x 2.43 x 4.21	6.08	0.10 x 2.40	0.26	2.43	0.92	9.71	9.7
1C.	0.57 x 2.43 x 1.50	1.53	0.47 x 2.55	1.20	0.87	2.96	6.56	16.3
2CA14	0.51 x 2.43 x 4.21	6.08	0.10 x 2.40 0.47 x 2.55	0.26 1.46	2.43	0.92	11.65	11.5
1C.	0.57 x "	6.65	0.83 x 2.55 0.10 x 2.40	2.12 0.26	2.43	2.96	17.12	30.6
2CB1	0.51 x 1.42 x 2.81	2.06	1.67 x 2.55	4.25	0.85	0.39	3.51	3.5
1C.	0.57 x "	2.27	0.10 x 2.40	0.26	0.85	1.10	4.47	12.0
2CB1	0.51 x 1.42 x 2.78	2.01	0.47 x 2.55	1.20	1.23	0.92	3.99	4.0
1C.	0.57 x "	2.25	1.67 x 1.27	0.54 2.13	1.26	1.10	7.34	11.3
2CB2	0.51 x 2.43 x 5.59	6.12	1.67 x 2.55	4.25	2.82	0.54	11.36	11.4
1C.	0.57 x "	6.97			2.82	1.74	17.81	29.2
2CB3	0.51 x 2.43 x 5.59	6.02	1.66 x 1.0	1.63	2.82	0.54	11.36	11.4
1C.	0.57 x "	6.97	1.31 x 5.15	6.74	2.82	1.74	21.95	32.3
2CB4	0.51 x 2.43 x 5.59	6.02	1.66 x 0.5	0.84	2.82	0.54	11.36	11.4
1C.	0.57 x (1.42 x 5.59 + 1.5) 5.64	5.64	1.31 x 5.15	6.74	2.82	1.74	17.96	29.2

	ROOF & FLOOR	WALL	CEILING	CEILING	W	P	
2600	0.51 x 2.87 x 5.59 0.12			2.87	0.54	11.30	11.9
1C	0.51 x 2.87 x 1.39 2.24			1.47	1.02	5.91	16.4
2611	0.51 x 1.42 x 1.39 1.00	0.10 x 2.0	0.20	0.80	0.42	2.50	2.6
1C	0.51 x " " 1.12	0.10 x 1.70 0.40 x 1.20	0.22 0.50	0.80	1.10	3.90	6.5
2612	0.51 x 2.87 x 1.39 2.01	0.10 x 2.0	0.20	1.29	0.02	4.00	9.0
1C	0.51 x " " 2.24	0.10 x 2.5	0.40	1.29	1.10	5.00	9.1
2610	0.51 x 2.87 x 1.39 2.01	0.10 x 2.0	0.20	1.29	0.41	4.00	4.0
1C	0.51 x " " 2.24	0.10 x 2.5 0.40 x 2.5	0.40 1.20	1.29	1.10	6.20	10.3

## 2-4 SEISMIC FORCE

ROOF	$0.46 \times 569.0$	261.7	
PARAPET	$0.10 \times 124$	12.4	
WALL	$0.77 \times 255 \times 19$	29.5	
	$0.59 \times 155 \times 42.1$	35.2	} 69.3
ORIENT	$0.15 \times 155 \times 25.3$	5.9	
PARTITION	$0.46 \times 153 \times 42.0$	29.2	
BEAM	$0.35 \times 199.0$	69.9	
	$0.51 \times 121.4$	61.9	
COLUMN	$0.51 \times 22 \times 19$	21.3	
	$0.30 \times 160 \times 17$	9.2	
	$0.19 \times 22 \times 25$	10.6	$54.7 \times 0.1 = 5.47$
FLOOR	$0.47 \times 378.4$	177.8	
	$0.76 \times 95.3$	72.4	
	$0.36 \times 95$	3.1	
WALL	FROM UPPER STAIRS	$69.3 + 2.25$	
	$0.84 \times 255 \times 19$	32.0	
	$0.18 \times 255 \times 19$	35.7	
	$0.54 \times 1.5 \times 36.7$	29.7	
	$0.15 \times 15 \times 7.6$	1.7	
	$0.47 \times 122 \times 57.0$	32.0	
BEAM	$0.30 \times 199.0$	60.9	
	$0.51 \times 102.0$	51.0	
COLUMN	$0.51 \times 3.6 \times 19$	33.9	
	$0.30 \times 3.4 \times 17$	17.4	
	$0.19 \times 3.6 \times 25$	10.1	$669.5 \times 0.1 = 66.95$

$\Sigma 121.2$

2-5 STIFFNESS RATIO

$E_s = 10^3$

	b x D	$J_{0.4}$	$Q$	$K_{10}$	$\phi$	
2C	200 x 75	93.4	350	27.3		2.73
	75 x 70	13.7	"	3.6		0.36
	200 x 45	21.3	"	5.9		0.59
	45 x 20	0.2	"	2.3		0.23
	20 x 20	5.1	"	1.4		0.14
1C	200 x 75	93.4	400	34.6		2.46
	75 x 20	13.7	"	3.4		0.34
	200 x 45	21.3	"	5.3		0.53
	45 x 20	0.2	"	2.1		0.21
	20 x 20	5.1	"	1.3		0.13
G	200 x 50	29.7	283	10.3	1.37 1.67	1.37 1.62
	"	"	275	10.6	1.37 1.57	1.41 1.66
	20 x 75	93.4	642	11.7	1.5 2.0	1.75 2.34
FG	35 x 90	27.6	283	75.1		75.1
	"		275	77.3		77.3
	"		252	25.3		25.3

1.37  
1.41  
1.75

(C)

1.37	1.37	1.37	1.37				
0.14	0.14	0.14	0.16				
1.37	1.37	1.37					
0.13	0.13	0.13					
7.51	7.51						

(B)

1.62	1.62	1.62		1.62	1.62	1.62	1.62
0.14	0.23	0.23	0.23	260	0.23	0.23	0.23
1.62	1.62	1.62			1.62	1.37	1.37
0.13	0.21	0.21		400	0.21	0.21	0.21
7.51	7.51				7.51	7.51	

(A)

1.37	1.37	1.37	
0.23	0.23	0.23	
1.37	1.37		
0.24	0.24		
7.51	7.51		
2.03	2.03		

(8)

(9)

(10)

1.37	1.37	1.37
0.23	0.23	0.23
1.37	1.03	1.03
0.24	0.24	0.24
7.51	7.51	

(I)

1.32	1.32	1.32	1.41	
2.13	0.14	0.14	0.14	0.14
1.32	1.32	1.32	1.41	
2.46	0.13	0.13	0.13	0.13
7.51	7.51	7.51	17.17	
2.01	2.01	2.01	2.05	

(2)

205	2.79	1.66	0.14
246	2.74 (1.05) (9)	1.66	0.13
	2.53	1.73	

(10)

129	2.79	1.66	0.14
		1.66	0.13
	2.53	1.73	
0.67		2.75	

2-6 CALCULATION OF STRESS

1. Day

h	1955	1955	1159	1409	1359	1321	260	721	676	672
	0.12	0.13	0.12	0.20	0.10	0.20	0.39	0.20	0.29	0.29
Q	0.6	0.6	0.6	0.9	0.9	0.9	1.1	1.4	1.3	1.3
B <sub>1</sub>	0.45	0.55	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
	10.49	21.05	12.46	15.91	14.74	13.05	4.03	2.06	7.06	6.06
	0.11	0.12	0.12	0.19	0.19	0.19	0.26	0.29	0.26	0.26
	1.2	1.3	1.3	2.0	2.0	2.0	2.8	3.1	3.0	3.0
	0.50	0.50	0.50	0.50	0.40	0.40	0.45	0.50	0.40	0.40

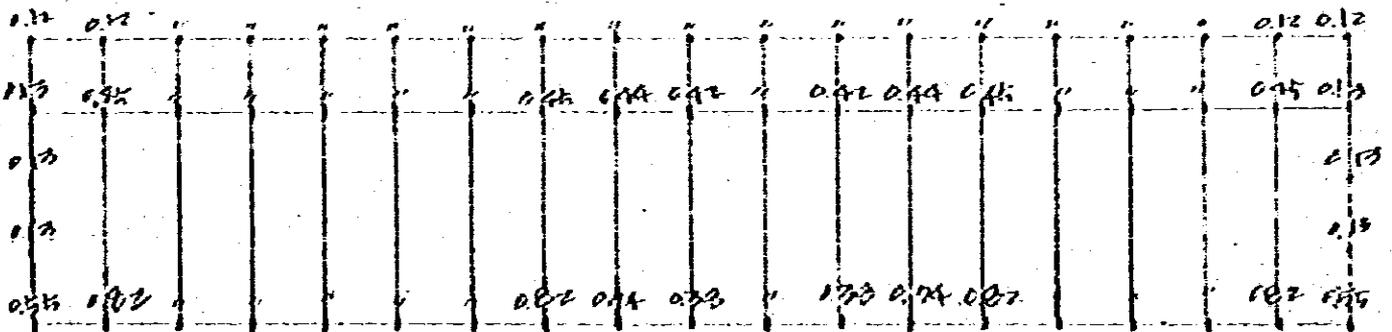
0.12	0.13											0.13	0.12
0.12	0.20											0.20	0.12
0.30	0.30											0.30	0.29

$\Sigma D = 11.64$        $\Sigma Q = 44.2$

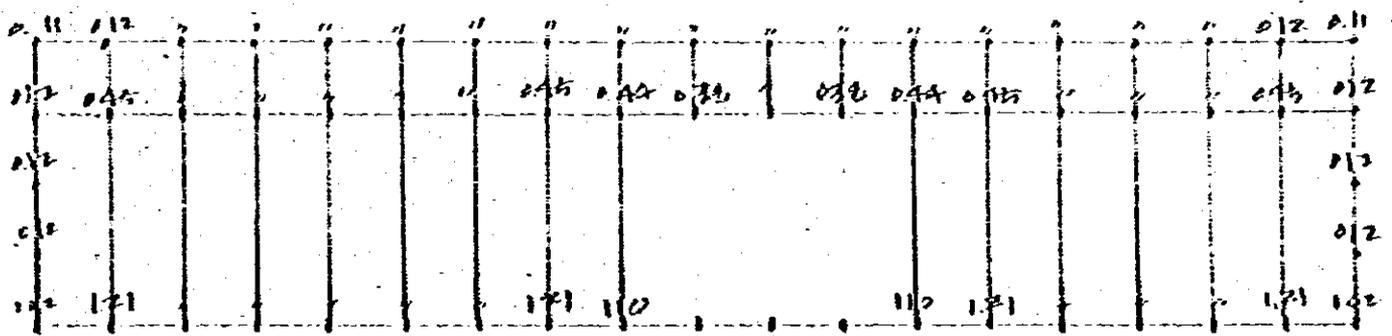
0.11	0.12												0.12	0.11
0.12	0.19												0.19	0.17
0.20	0.20												0.20	0.26

$\Sigma D = 11.19$        $\Sigma Q = 42.2$

0.51	19.71	19.53	10.07	0.96	5.90	11.26	1.51	4.80	11.25
0.55	0.13	0.13	0.12	0.02	0.05	0.12	0.73	0.42	0.12
1.2	0.3	0.3	0.3	1.9	1.0	0.3	1.4	1.0	0.3
0.35	0.06	0.05	0.05	0.40	0.05	0.05	0.55	0.05	0.05
0.56	21.23	21.95	15.85	0.95	7.55	12.07	3.13	12.00	
1.02	0.12	0.12	0.11	1.21	0.05	0.12	0.28	0.12	
4.1	0.5	0.5	0.5	4.00	1.0	0.5	1.5	0.5	
0.55	0.50	0.50	0.50	0.60	0.50	0.50	0.55	0.50	



$\Sigma D = 27.16$        $\Sigma Q = 15.02$



$\Sigma D = 29.16$        $\Sigma Q = 121.2 - 1.2 \times 3 = 115.8$







②

	92	72	01	56	02
67	92	04		10	
	119	9.1	90	40	0.2
		0.7		11	
41			16	15	0
15			30	0	0
21			0.2	0.6	0

③

	99	74	00	51	02
69	99	01		14	
	112	13.6	12	16	01
	127	14.0	14	2.7	0.4
				3.6	
77			10	16	0.1
29			3	0	0
34			0.7	1.0	0

④

	90	74	01	53	02
51	94	03		16	
	105	10.6	11	16	0.1
		12.3	11.2	6	0.3
				12	
56			0.7	1.9	0.1
17			1.0	0	0
2.1			0.2	0.6	0

⑩

	61	74	06	64	01
		97		1.0	
			0.7	1.6	0.1
			0	0	0.2
				1.3	
61			0.2	0.2	0.1
3.1			0.2	0.2	0
2.1			0	0.2	0

2-7 DESIGN OF SECTION

BEAM

RG <sub>2</sub>	M <sub>DE</sub>	M <sub>C</sub>	M <sub>TE</sub>	Q
L	0.3	0.9	0.9	1.6
E	2.2	0.4	1.4	1.3
S	2.4		2.3	4.2
	1.9	1.3	0.5	

$b \times d = 23 \times 130 \quad ; \quad x = 39.3$

$A_s = 2.40 / 39.3 \times 3.0 = 2.12 \quad \text{Z-D13}$

RG <sub>1</sub>	M <sub>DE</sub>	M <sub>C</sub>	M <sub>TE</sub>	Q
L	0.4	1.5	2.2	2.5
E	2.6	1.4	2.3	2.3
S	4.0	2.7	5.0	4.1
	2.2			

$b \times d = 23 \times 150$

$A_{DE} = 2.6 \times 39.3 \times 9 = 9400$

$A_{DE} = 940 / 39.3 \times 3.0 = 7.9 \quad \text{Z-D19}$

$A_{SE} = 6500 / \quad \quad \quad = 4.2 \quad \text{Z-D19}$

2GAIN	M <sub>DE</sub>	M <sub>C</sub>	M <sub>TE</sub>	Q
L	0.5	0.7	1.2	2.0
E	7.2	1.5	4.3	4.1
S	7.7	2.2	5.5	11.2
	6.7		3.1	

$b \times d = 23 \times 150$

$A_{DE} = 7.20 / 39.3 \times 3.0 = 6.5$

$A_{SE} = 650 / \quad \quad \quad = 4.7 \quad \text{Z-D19}$

$\Delta Q = 11.2 \cdot 9.9 = 1.3$   
 $\Delta Q / 4 = 1.10$   
 $P_w = 0.27$   
 $\rho_{10} x = 14.3 / 23 \times 0.27 = 1.89 \rightarrow 1.5 \text{ (D)}$

- Z-D19
- Z-D13
- Z-D19

REGIME	POE	PL	POE	Q
L	0.5	0.5	0.6	1.2
E	2.6	0.3	0.3	10
S	3.1	0.9	0.9	3.2
	3.1		0.3	

$b < D = 2.7 < 5.0$

$Q_{OE} = 310 / 119.7 < 3.0 = 2.6$       2-D16

$Q_{TE} = 90 / \dots = 0.9$       2-D14

REGIME	POE	PL	POE	Q
L	1.3	1.0	1.6	3.2
E	7.2	3.2	0.8	2.8
S	6.5	4.2	2.4	6.8
	6.9		0.8	

$b < D = 2.7 < 5.0$

$Q_{OE} = 650 / 29.7 < 3.0 = 1.2$       2-D19  
2-D12

$Q_{TE} = 420 / \dots = 1.5$       2-D19

$Q_{TE} = 240 / \dots = 2.0$       2-D19

REGIME	POE	PL	POE	Q	POE	PL	POE	Q
L	9.2	6.4	6.1	1.4	5.4	1.3	0.2	1.4
E	4.1	1.5	1.1	0.6	1.1	0.3	0.6	0.6

$b < D$        $2.7 < 11.5$        $1.2 < 6.2$        $2.7 < 5.0$

$Q_{TE} = 7.2$        $7.2$        $6.6$        $6.9$        $2.0$        $0.3$

$Q = 1240 / 61.2 < 12 = 10.1$

$2-D19$        $2-D19$        $2-D19$        $2-D19$   
 $2-D16$        $2-D13$        $2-D13$        $2-D13$   
 $2-D12$        $2-D12$        $2-D12$        $2-D12$   
 $2-D14$        $2-D14$        $2-D14$        $2-D14$

ΣZAMC	ΠOE	ΠC	ΠTE	Q	ΠHE	ΠC	ΠOE	Q
L	11.9	4.4	9.0	9.1	4.9	1.1	0.2	1.6
E	10.4	3.8	2.9	1.6	2.7	0.6	1.5	1.5
S	2.7				2.6	1.7	1.7	4.6
b10		2.8 x 1.5						2.8 x 5.0

$2Q_A = 2.8 \times 61.2 \times 6.0 = 10.3^T$

a	12.2	6.7	7.9		6.5	1.4	1.4	
n	2-D19 2-D17	2-D13 2-D19	2-D19 2-D16		2-D19 2-D13		2-D19	

ΣZAMC	ΠOE	ΠC	ΠTE	Q	ΠHE	ΠC	ΠOE	Q
L	10.9	14.0	14.0	13.6	2.7	2.6	0.4	1.6
E	10.4	3.8	2.9	1.6	2.7	0.6	1.5	1.5
S	2.7				10.4	3.2	1.9	4.6
b10		2.8 x 1.5						2.8 x 5.0
a	13.9	11.4	11.9		0.8	2.7	1.6	
n	4-D12	2-D12 2-D16	2-D22 2-D16		2-D22 2-D16		2-D22	

$\Delta Q = 13.6 - 10.3 = 3.3$

$\Delta Q / Q_j = 1.93$

$P_j = 0.39$

$b10 \pi = 1.43 / (2.8 \times 0.39) = 13.1 \rightarrow 100$

ZRQAB	$\mu_{SE}$	$\mu_L$	$\mu_{SE}$	$\sigma$
L	14.5	17.3	11.2	10.6
E	8.6	7.1	2.5	1.2
S	23.1			
$b \times D = 20 \times 1.5$				
A	12.6	10.6	9.2	
n	2.022 2.019	2.022 2.016	2.022 2.013	

$PO = 10.6 \cdot 10.3 = 0.3$   
 $0.2/0.1 = 0.19$   
 $P_{10} = 0.22$   
 $P_{10} \times 14.3 / 7.1 \times 0.22$   
 $= 23.2 \rightarrow 11.2 \text{ (A)}$

12610AB	$\mu_{SE}$	$\mu_L$	$\mu_{SE}$	$\sigma$
L	6.1	9.7	8.6	7.9
E	6.2	2.5	1.2	0.9
D	12.3			
$b \times D = 20 \times 1.5$				

A	6.7	9.9	7.0	
n	2.019 2.013	2.019 2.016	2.019 2.013	

ZG00C	$\mu_{SE}$	$\mu_L$	$\mu_{SE}$	$\sigma$
L	0	1.3	0.2	1.6
E	4.5	1.5	1.5	2.2
S	4.5	2.8	1.7	6.0
$b \times D = 20 \times 1.5$				
A	3.8	2.4	1.4	
n	2.016	2.016	2.016	

COLUMN

ZCAI	P		K		Q	
	x	y	x	y	x	y
L	4.1		0.7	0.5	0.2	0.4
E	1.3	1.3	2.2	1.8	1.1	1.4
S	5.4	5.4	7.6	7.8	2.9	3.2

$b \times d = 2.3 \times 17.5$        $b/H = 2.3/7.7 = 1/11.9 \quad \lambda = 1.00$   
 $d/H = 0.9 \times 7.7/1.8 = 1.24$

ZCAI	P/bD		K/bD <sup>2</sup>		P/H		d/H	
	x	y	x	y	x	y	x	y
L	2.0		0.6	0.5	-	-		
E	2.6	2.3	5.3	2.4	0.22	0.22	4.2	2.5
S	1.3	1.3	5.3	2.4	0.22	0.22	4.2	2.5

$d_{max} = 16.0$        $\Sigma M = 6.019$        $2.019 \quad 2.019$   
 $Q_{AX} = 17.5 \times 2.1 \times 6.0 = 9.0$   
 $Q_{AY} = 7.7 \times 2.2 \times 6.0 = 10.3$

ICAI	P		K		Q	
	x	y	x	y	x	y
L	12.0		0.2	0.5	0.1	0.2
E	5.4	4.4	5.4	6.0	2.8	4.3
S	18.1	17.4	6.3	11.5	5.7	8.6

$b \times d = 2.3 \times 17.5$   
 $b/H = 2.3/9.0 = 1/14.3 \quad \lambda = 1.00$   
 $d/H = 0.9 \times 9.0/7.7 \times 0.2 = 9.5$

ICAI	P/bD		K/bD <sup>2</sup>		P/H		d/H	
	x	y	x	y	x	y	x	y
L	6.2		0.4	0.3	-	-		
E	2.3	2.3	12.4	7.1	0.32	0.22	10.5	4.6
S	2.6	2.6	12.4	7.1	0.32	0.22	10.5	4.6

$2.019 \quad 2.019$

2CA2

	x	P	Y	x	H	Y	x	Q	Y
L		11.7		0	0.1	4.2	0	4.7	
E	0.3	0.5		2.6	2.3	4.1	1.4	1.9	
S	12.0	12.2		2.4	12.3		2.4	4.5	
		11.4	11.2						

b x D = 2.4 x 75

	x	P/bD	Y	x	H/bD <sup>2</sup>	Y	x	P <sub>2</sub>	Y	Q <sub>1</sub>	Y
L		5.6		0.2	5.9		-	0.25		5.3	
S	5.7	5.6	5.7	6.0	8.5		0.15	0.25		3.2	2.019
		5.6	5.7								

2.019

1CA2

	x	P	Y	x	H	Y	x	Q	Y
L		20.9		0	4.1	2.1	0	1.5	
E	1.4	1.9		6.2	6.2	7.7	3.1	4.6	
S	29.3	29.6		6.2	13.0		6.2	10.7	
		25.5	26.0						

$0.05 = 10.7 - 10.2 = 0.5$

$2.7/14 = 0.23$

$F_{20} = 0.22$

$F_{10} = 1.73 / 1.8 = 0.96$   
 $= 2.32$

	x	P/bD	Y	x	H/bD <sup>2</sup>	Y	x	P <sub>2</sub>	Y	Q <sub>1</sub>	Y
L		13.7		0	2.6		-	-			
S	15.3	14.2	14.2	13.2	4.7		0.25	0.16		2.4	3.019
		12.5	11.4								

3.019

2CA2

	x	P	Y	x	H	Y	x	Q	Y
L		12.5		0	4.9	11.2	0	5.9	
E	0	0.5		2.6	2.3	4.1	1.4	1.6	
S	12.5	12.0	12.0	2.4	12.9		2.4	4.1	

b x D = 2.4 x 75

	x	P/bD	Y	x	H/bD <sup>2</sup>	Y	x	P <sub>2</sub>	Y	Q <sub>1</sub>	Y
L		6.0		0	11.1		-	0.26		9.6	
S	6.0	6.2	5.7	6.0	8.9		0.15	0.26		3.2	2.019

1CA7	x	P	Y	x	12	Y	x	0	Y
L		24.1		0	0	17.7	3.9	0	2.9
E	0		1.9	6.2	6.2	3.9	11.8	3.1	4.6
S	34.1	34.2	32.2	6.2		15.4	6.2	12.1	

$b \times D = 2.0 \times 17.5$   
 $b \times D = 35$   
 $b \times D = 12.1 - 10.3 = 1.8$   
 $b \times D = 2.0 \times 1.05$   
 $b \times D = 2.0$   
 $b \times D = 1.4 / 4.9 \times 10.3$   
 $b \times D = 12.9 \rightarrow 10.0$

	x	P/100	Y	x	17/100	Y	x	12	Y	x	0	Y	x	11	Y
L		16.2		0		4.9									
S	15.2	17.1	15.7	13.1		9.5	13.2	0.17	6.7	3.6	3.0	2.0	2.0	2.0	2.0

2-D19

2CA11	x	P	Y	x	12	Y	x	0	Y
L		9.7		0	0	6.31	0		1.2
E	0		2.9	0.6	1.0	6.2	6.9	0.6	1.6
S	9.7	10.6	9.0	1.0		12.1	1.0		4.0

$b \times D = 7.7 \times 0.75$

	x	P/100	Y	x	17/100	Y	x	12	Y	x	0	Y	x	11	Y
L		4.6		0		3.9			0.12						
S	4.6	5.0	4.2	2.1		9.5	0.1	0.09	2.1	5.0	2.0	2.0	2.0	2.0	2.0

2-D19

2CA1	x	P	Y	x	12	Y	x	0	Y
L		3.5		0	0				0
E			1.1	0.6	0.5				0.3
S		4.5	2.4	0.6					0.6

$b \times D = 2.0 \times 2.9$

	x	P/100	Y	x	17/100	Y	x	12	Y	x	0	Y	x	11	Y
L		4.5		0											
S		5.9	3.1	2.9		0.1	0.8		2.0	1.6	2.0	2.0	2.0	2.0	2.0

$1.34 = 6.7$        $2.1 = 4.0$

ICAI	P	R	Q			
L	12.0	0	0			
E	37	1.0 1.0	0.5			
S	15.7 23	1.0	1.0			
b x D = 22.6 x 22.6				sD = 13.0		
	P/bD	R/bD <sup>2</sup>	PA	At	n	
L	15.6	-	-			
S	20.1 12.6	5.6	200	0.73	2-016	

2CPI	P		R		Q								
	x	y	x	y	x	y							
L	4.0		0.2 0.2	0	0.1	0							
E	12	0.1	1.2 1.0	0.6 0.5	0.6	0.3							
S	5.2 2.0	4.1 2.9	1.4	0.6	1.3	0.6							
b x D = 22.6 x 22.6													
	x	P/bD	y	x	R/bD <sup>2</sup>	y	x	PA	y	x	At	y	n
L		5.1		1.1	0.6								2-016
S		6.7 2.6	5.3 5.0	0.9	2.9	0.27	0.03	2.1	0.6				2-016

ICAI	P		R		Q								
	x	y	x	y	x	y							
L	11.3		0.2 0.1	0	0.1	0							
E	4.7	0.4	2 2.6	1.0 1.0	1.3	0.5							
S	16.0 6.6	11.0 10.9	2.6	1.0	2.7	1.0							
b x D = 22.6 x 22.6													
	x	P/bD	y	x	R/bD <sup>2</sup>	y	x	PA	y	x	At	y	n
L		4.5		1.1	-								
S		20.5 4.5	15.0 19.0	15.6	5.6	15.7	-	4.1					2-019

2CBZ	x	P	Y	x	R	Y	x	Q	Y
L		11.4		0	0	2.0	2.6	0	1.5
E	0.6	0.1		1.3	1.5	2.2	1.6	0.9	1.1
S	12.0 10.8	11.5 11.3		1.3		4.9		1.6	3.0

$b \times D = 2.6 \times 4.5$

	x	P/60	Y	x	R/60	Y	x	Q	Y	x	R	Y
L		0.0		-	4.9		-	0.12				2-0.16
S	9.5 8.5	9.1 8.9		6.3	4.9		0.12	0.22		1.5	2.4	2-0.16

$0.8 \times 10.1 = 8.08$       $2.4 \times 3.3 = 7.92$

$SOAX = 4.5 \times 20.1 \times 9 = 8.1$

$SOAY = 2.4 \times 3.3 \times 9 = 8.3$

1CBZ	x	P	Y	x	R	Y	x	Q	Y
L		29.2		0	0	15.0	0.6		
E	2.2	0.2		4.0	4.0	2.0	1.9		
S	21.4 21.0	29.6 29.0		4.0		5.7		4.0	4.4

$b \times D = 2.4 \times 4.5$

	x	P/60	Y	x	R/60	Y	x	Q	Y	x	R	Y
L		0.0		-	2.0		-	-				2-0.16
S	24.4 24.0	27.3 27.0		15.1	9.6		0.27	0.05		4.0	0.6	2.4

1CBZ	x	P	Y	x	R	Y	x	Q	Y
L		21.3		0	0	2.6	1.3	0	1.0
E	0	0.2		4.0	4.0	2.0	1.9		
S	21.0 21.0	21.3 21.1		4.0		6.4		4.0	4.0

$b \times D = 20 \times 45$

	$x \frac{P}{10} y$	$x \frac{P}{10^2} y$	$x \frac{P}{10} y$						
L	25.6	-	4.5	-	-	-	-	-	-
S	25.6 25.4 21.5	14.1	11.6	0.35	0.21	4.4	2.6	3.016	2.016

$2C_{11}$

	$x P y$	$x H y$	$x Q y$
L	2.6	0.1	0.1
E	0.6	0.3	1.2
S	7.2 7.0	2.9 2.3	1.3

$b \times D = 20 \times 20$

	$x \frac{P}{10} y$	$x \frac{P}{10^2} y$	$x \frac{P}{10} y$				
L	2.3	0.5	0.6	-	-	-	-
S	4.1 3.5	3.7 2.9	2.3	4.0	0.26	0.12	2.0

$1C_{11}$

	$x P y$	$x H y$	$x Q y$
L	6.5	0	0
E	2.4	1.1	2.4
S	8.9 6.1	7.6 5.4	2.4

$b \times D = 20 \times 20$

	$x \frac{P}{10} y$	$x \frac{P}{10^2} y$	$x \frac{P}{10} y$				
L	4.3	-	-	-	-	-	-
S	11.4 5.2	9.7 6.9	12.6	5.6	0.48	0.12	3.7

$2C_{12}$

	$x P y$	$x H y$	$x Q y$
L	4.0	0	0.2
E	0.2	0.6	1.2
S	4.2 3.8	4.6 3.4	1.2

$b \times b = 2B \times 2B$

	$x$	$\frac{P}{bD}$	$y$	$x$	$\frac{12/b^3}$	$y$	$x$	$P$	$y$	$x$	$Q$	$y$	$x$	$\pi$	$y$
L		5.1		0	1.1										
S	5.4	5.4	4.9	4.9	0.6	4.5	0.70	0.11	1.6	0.9	2.016				

2.016

IC2

	$x$	$P$	$y$	$x$	$\pi$	$y$	$x$	$Q$	$y$
L		9.1		0	0	0	0	0	
E	0	2.1	2.1	2.6	2.6	1.0	1.3	0.5	
B	4.1	11.2	11.2	2.6	2.6	1.0	2.6	1.0	

$b \times b = 2B \times 2B$

	$x$	$\frac{P}{bD}$	$y$	$x$	$\frac{12/b^3}$	$y$	$x$	$P$	$y$	$x$	$Q$	$y$	$x$	$\pi$	$y$
L		11.7													
S	11.7	14.4	14.4	14.4	14.4	5.6	0.44	0.08	3.4	0.6	2.016				

2.016

LAB

$$L_1 = 207 \quad \rho_1 = 242 \quad \lambda = 297 \quad w_x = 0.66 \quad w_z = 0.66 \quad w_L = 0.66$$

$$P_{x1} = 0.082 \times 10 \times 207^2 = 0.657W \quad 0.37 \quad 0.43 \quad 0.57$$

$$P_{x2} = 0.055 \times \quad " \quad = 0.440W \quad 0.25 \quad 0.29 \quad 0.36$$

$$P_{y1} = 0.142 \times \quad " \quad = 0.776W \quad 0.19 \quad 0.22 \quad 0.29$$

$$P_{y2} = 0.070 \times \quad " \quad = 0.229W \quad 0.13 \quad 0.15 \quad 0.19$$

$$D = 10 \quad \dot{\theta}_x = 6.1 \quad \dot{\theta}_y = 5.2$$

$$a_{x1} = 3.0 \quad \overset{R}{D10} \quad 210 \quad 3.5 \quad \overset{Z}{D10} \quad 200 \quad 4.6 \quad \overset{L}{D10} \quad 150$$

$$a_{x2} = 2.0 \quad " \quad 2A \quad " \quad 3.1 \quad "$$

$$a_{y1} = 1.8 \quad \overset{R}{D10} \quad 200 \quad 2.1 \quad \overset{Z}{D10} \quad 200 \quad 2.8 \quad \overset{L}{D10} \quad 250$$

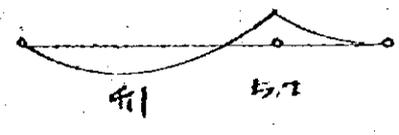
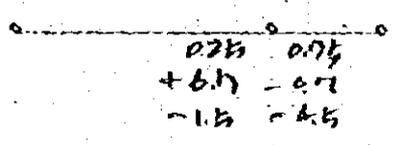
$$a_{y2} = 1.2 \quad " \quad 1.4 \quad " \quad 1.9 \quad "$$



NON WAVE  $w = 0.52$

$L = 0.76 \times 4.4^2 / 1.2 = 4.5$

$\pi = \quad \quad \quad / 0 = 6.5$



$\Sigma \pi = 0.6 + 5.7 = 6.3$

$Q_c = 4.1 / 0.76 = 5.4 = 2.0 \quad 2-D19$

$Q_{SS} = 5.7 / \quad \quad = 4.0 \quad 2-D19$

FOOTING

$\sum P = 354 = 304$

$W = 1.05 \times 0.55 \times 2.9 = 2.0$

$\sum P = 330 - 2.0 = 328$

	P	WALL	TIE BEAM	ZIP	Ø x W	l x l'
A1	120	0.54 x 1.27 2.69 1.17 x 1.17 1.35	2.15	17.8	354 x 1	105 x 105
A2	27.9	0.55 x 2.55 1.38 0.54 x 2.55 1.35	5.35	34.6	354 x 2	105 x 210
A3	34.1	1.31 x 4.0 2 5.23 2.54 x 1.27 1.19	5.35	46.7	354 x 3	105 x 315
A4	29.7	1.31 x 4.0 1 5.23	5.35	41.1	"	"
A11	16.3		5.35	21.7	354 x 2	105 x 210
A14	30.6	0.54 x 2.55 1.38	5.35	37.3	"	"
A'1	12.0	1.15 x 7.5 3 4.25	2.15	14.4	354 x 1	105 x 105
B1	11.3	1.15 x 2.7 2.13	3.19	16.6	"	"
B2	29.2	1.15 x 2.55 4.25 1.15 x 1.0 1.63	6.40	39.9	354 x 2	105 x 210
B3	32.3	1.31 x 3.15 6.74	6.40	47.1	354 x 3	105 x 315
B4	29.2	1.31 x 5.15 1.74	6.40	42.7	"	"
B10	16.8		6.40	23.2	354 x 2	105 x 210
C1	6.5	0.15 x 1.15 0.22 0.47 x 1.15 0.53	7.14	9.4	354 x 1	105 x 105
C2	9.1	0.15 x 2.55 0.43 0.15 x 2.55 0.43	3.21	12.7	"	"
C10	10.3	0.47 x 2.55 1.20	3.21	15.1	"	"

$$F_1 \quad 350 \times 1 \quad 105 \times 105 \quad D = 95 \quad \rho = 59.5$$

$$u = 5.016$$

$$F_2 \quad 350 \times 2 \quad 105 \times 210$$

$$\sigma_p = 399 / 2 = 200 = \sigma$$

$$\tau_s = 200 \times 10^3 / 105 \times 59.5 = 3.2 < 5$$

$$u = 200 \times 10^3 / 59.5 \times 15 = 22.4$$

$$u = 200 \times 57.5 / 59.5 \times 2.0 = 3.6 \quad \left. \vphantom{u} \right\} 5.016$$

$$F_3 \quad 350 \times 3 \quad 105 \times 315$$

$$\sigma_p = 477.1 / 3 = 159$$

$$\sigma = 159 \times 10^3 / 59.5 \times 15 = 17.6$$

$$u = 159 \times 10^3 / 59.5 \times 2.0 = 13.9 \quad \left. \vphantom{u} \right\} 5.019$$

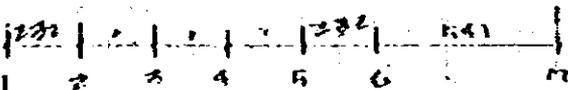
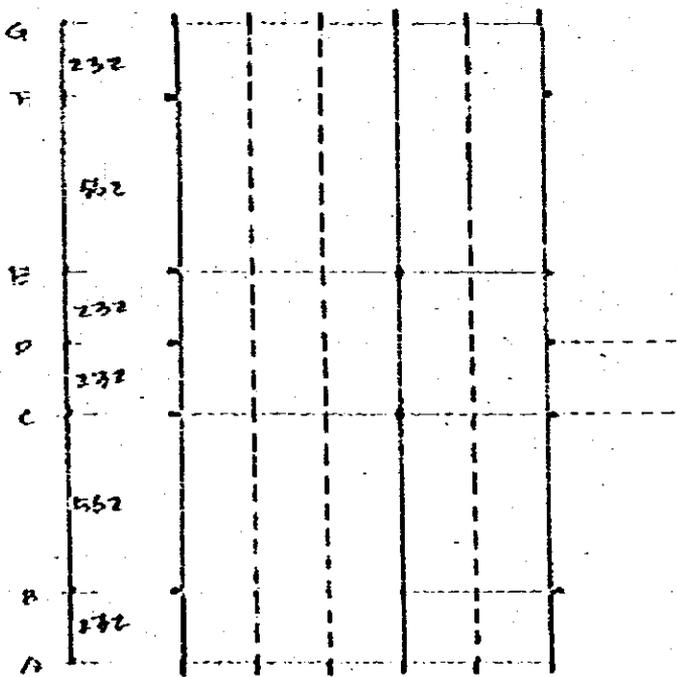
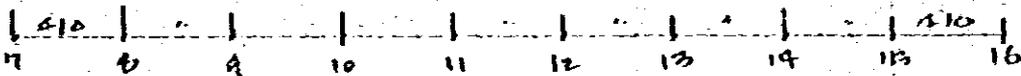
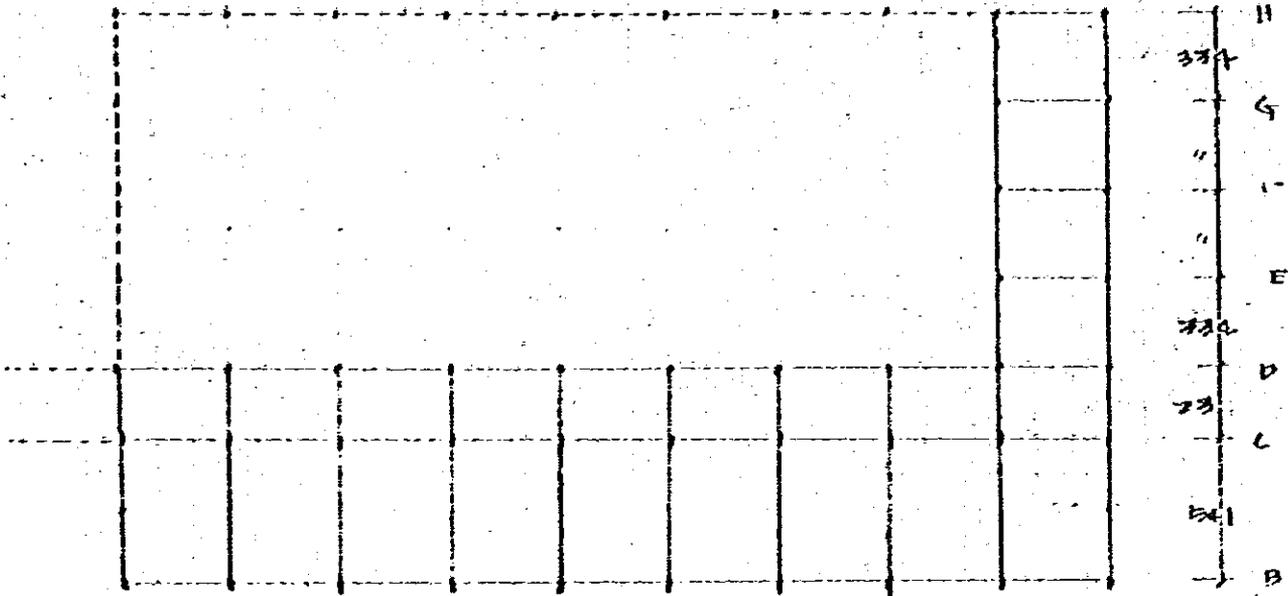
3 宿 舍

3-1 LOAD1. DEAD LOAD

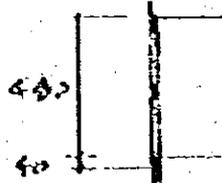
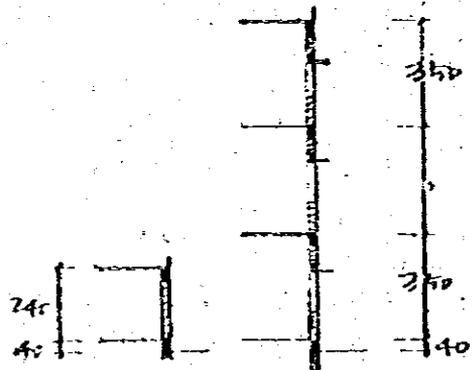
ROOF	LIKE CONCRETE	10cm	200	} 510 $\frac{kg}{m^2}$ (DINING ROOM 460')
	R.C. SLAB	12cm	240	
	CEILING		20	
FLOOR	TERAZZO TILE	5	100	} 410'
	R.C. SLAB	12	240	
	CEILING		20	
WALL	BRICK	213.4	440	} 540'
	CEMENT MORTAR	2.5	150	
BEAM	28x50	340 $\frac{kg}{m}$		
	28x75	510 "	28x90	610'
COLUMN	28x75	510 "	404	310'
	28x45	300 "	40x40	320'
	28x28	190 "		

2 LIVE LOAD

	SLAB	FLARE	EARTHQUAKE
ROOF	100	50	0
FLOOR	120	120	60



DINING ROOM



3-2. C,  $\Pi_0$ ,  $\rho$  OF BEAMDOMITORY

B   $l_x = 2w$   $l_y = 4w$   $\lambda = 16z$

$$C = 1.6w^2 + 1.4w'$$

$$\Pi_0 = 2.5w^2 + 2.1w'$$

$$\rho = 1.25w^2 + 2.05w'$$

$$w_R = 0.56 \quad w_A = 0.54$$

$$w_R' = 0.34 \quad w_A' = 1.61$$

$$2.7 \quad 3.0$$

$$2.5 \quad 6.1$$

$$2.9 \quad 5.3$$

GCSA   $l_x = 4w$   $\lambda = 1.0$

$$C = 1.75w^2 + 1.9w'$$

$$\Pi_0 = 2.9w^2 + 2.1w'$$

$$\rho = 2.1w^2 + 2.05w'$$

$$w_R' = 0.44 \quad w_A' = 0.81$$

$$1.6 \quad 2.1$$

$$2.5 \quad 2.3$$

$$2.1 \quad 2.2$$

GCSA   $l_x = 2.32$   $l_y = 4.10$   $\lambda = 1.27$   
 $l_x = 4.10$

$$C = (1.45 + 1.75)w^2 + 1.9w'$$

$$\Pi_0 = (2.3 + 2.9)w^2 + 2.1w'$$

$$\rho = (1.7 + 2.1)w^2 + 2.05w'$$

$$w_R' = 0.34 \quad w_A' = 1.95$$

$$2.2 \quad 4.5$$

$$2.5 \quad 6.9$$

$$2.9 \quad 6.1$$

GCSA   $l_x = 2.32$   $l_y = 4.10$   $\lambda = 1.27$

$$C = 1.45w^2 + 1.9w'$$

$$\Pi_0 = 2.3w^2 + 2.1w'$$

$$\rho = 1.7w^2 + 2.05w'$$

$$w_R' = 0.44 \quad w_A' = 0.49$$

$$1.4 \quad 1.5 \quad 2.5$$

$$2.1 \quad 2.3 \quad 5.3$$

$$1.3 \quad 1.9 \quad 4.9$$

## GCSA 15.16

$$C = 1.6w^2 + 1.4w'$$

$$\Pi_0 = 2.5w^2 + 2.1w'$$

$$\rho = 1.25w^2 + 2.05w'$$

$$1.5 \quad 2.0$$

$$2.3 \quad 3.1$$

$$1.9 \quad 2.7$$

## GCSA 15.16

$$C = (1.45 + 1.6)w^2 + 1.9w'$$

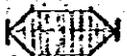
$$\Pi_0 = (2.3 + 2.1)w^2 + 2.1w'$$

$$\rho = (1.7 + 1.25)w^2 + 2.05w'$$

$$2.1 \quad 4.4$$

$$2.3 \quad 6.7$$

$$2.6 \quad 5.9$$

G98C   $l_x = 410$   $l_y = 541$   $\lambda = 1.32$

$C = 411 \times 2W + 2.44W'$

$M_0 = 63 \times 2W + 3.66W'$

$Q = 311 \times 2W + 3.71W'$

$w'_R = 0.51$   $w'_N = 1.76$

5.9 2.3

8.9 13.3

5.3 0.6

G99C   $l_x = 232$

$C = 0.33 \times 2W + 0.46W'$

$M_0 = 0.46 \times 2W + 0.67W'$

$Q = 0.66 \times 2W + 1.16W'$

$w'_R = 0.39$

0.5 0.5

0.5 0.1

1.1 1.1

G10C   $l_x = 410$   $l_y = 541$   $\lambda = 1.32$   
 $l_x = 270$   $l_y = 410$   $\lambda = 1.57$

$C = (411 + 4.7)W + 2.44W'$

$M_0 = (63 + 0.6)W + 3.66W'$

$Q = (311 + 3.7)W + 3.71W'$

$w'_R = 0.51$   $w'_N = 1.76$

5.9 2.9

9.7 14.0

5.4 2.7

G10B   $l_x = 375$

$C = 0.5W + 0.61W'$

$M_0 = 0.6W + 0.91W'$

$Q = 0.9W + 1.35W'$

$w'_R = 0.44$   $w'_N = 1.96$

0.6 1.5

0.9 2.2

1.1 3.2

G11C   $l_x = 232$

$C = 0.33W + 0.46W'$

$M_0 = 0.46W + 0.67W'$

$Q = 0.66W + 1.16W'$

$w'_R = 0.44$

$w'_N = 1.96$

0.4 0.4 1.2

0.5 0.6 1.6

0.9 0.9 2.1

LAUNDRY

G15116   $l_x = 375$   $l_y = 410$   $\lambda = 1.33$

$C = 1.0 \times 2W + 1.0W'$

$M_0 = 2.0 \times 2W + 2.1W'$

$Q = 2.1 \times 2W + 3.0W'$

$w'_R = 0.39$

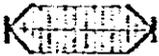
2.5

2.9

3.1

$\text{G15EF}$    $l_x = 339$   $\lambda = 1.10$   $w' = 0.31$   
 $C = 0.95w + 0.93w'$   $0.9$   
 $M_0 = 1.53w + 1.39w'$   $1.3$   
 $Q = 1.4w + 1.67w'$   $1.4$

DINING ROOM

$\text{B}_1$    $l_x = 232$   $l_y = 199$   $\lambda = 3.92$   $w' = 0.61$   
 $C = 6.0 \times 2w + 5.25w'$   $3.8$   
 $M_0 = 9.5 \times 2w + 7.97w'$   $5.7$   
 $Q = 4.2 \times 2w + 3.77w'$   $6.3$

$\text{B}_2$    $l_x = 232$   $l_y = 469$   $\lambda = 2.00$   $w' = 0.61$   
 $C = 1.85 \times 2w + 1.19w'$   $2.8$   
 $M_0 = 2.9 \times 2w + 2.19w'$   $4.7$   
 $Q = 2.0 \times 2w + 1.22w'$   $3.2$

$\text{B}_3$    $l_x = 272$   $l_y = 452$   $\lambda = 2.42$   $w' = 0.61$   
 $C = 2.9 \times 2w + 2.63w'$   $3.3$   
 $M_0 = 4.6 \times 2w + 3.95w'$   $6.7$   
 $Q = 2.7 \times 2w + 2.41w'$   $4.2$

$\text{B}_4$    $l_x = 232$   $\lambda = 1.80$   $w' = 0.39$   
 $C = 0.32 \times 2w + 0.45w'$   $0.6$   
 $M_0 = 0.53 \times 2w + 0.67w'$   $0.9$   
 $Q = 0.7 \times 2w + 1.16w'$   $1.3$

$\text{G113}$    $l_x = 232$   $\lambda = 1.00$   $w' = 0.49$   
 $C = 0.32w + 0.65w'$   $0.4$   
 $M_0 = 0.53w + 0.67w'$   $0.6$   
 $Q = 0.7w + 1.16w'$   $0.9$

G1045   $l = 964$   $P = 42 + 1.3 = 43.3$   $w' = 0.51$

$C = 2.21 W + 5.5 \times 4.4 / 10 + 1.77 W'$  5.2

$H_0 = 2.12 W + \quad \quad \quad 1.4 + 2.69 W'$  4.4

$Q = 2.69 W + 3.5 / 2 \quad \quad \quad + 2.31 W'$  5.3

G1014   $l = 696$   $P = 63 + 3.2 = 66.2$   $w' = 0.61$

$C = 4.81 W + 9.5 \times 6.96 \times 2 / 1 + 4.14 W'$  19.0

$H_0 = 7.10 W + 9.5 \times 1.96 \times 1 / 3 + 6.08 W'$  29.5

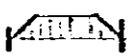
$Q = 4.64 W + 4.15 \quad \quad \quad + 3.44 W'$  12.7

G1015   $l = 464$   $P = 32 + 4.2 = 36.2$   $w' = 0.61$

$C = 2.21 W + 7.4 \times 4.5 / 10 + 1.09 W'$  6.5

$H_0 = 2.17 W + \quad \quad \quad 1.4 + 2.69 W'$  11.8

$Q = 2.69 W + 7.4 / 2 \quad \quad \quad + 2.31 W'$  5.15

G1016   $l = 272$   $l_y = 562$   $\lambda = 2.4 \cdot l$   $w' = 0.14$

$C = 2.9 W + 2.63 W'$  2.6

$H_0 = 4.6 W + 3.9 W'$  4.1

$Q = 2.5 W + 2.1 W'$  2.6

B1  $l = 2.72$   $w' = 1.14$

$C = 0.45 W'$  0.6

$H_0 = 0.67 W'$  0.8

$Q = 1.14 W'$  1.5

B2  $l = 2.62$   $w' = 1.26$

$C = 2.63 W'$  2.3

$H_0 = 2.13 W'$  5.0

$Q = 2.31 W'$  2.5

3-3 AXIAL FORCE OF COLUMN

	ROOF & FLOOR		WALL		BRAN	COLUMN	W	P
3Cell	0.56 x 4.1 x 2.0	6.22	0.10 x 4.1 0.64 x 3.82	0.41 2.99	2.61	1.00	12.71	12.6
2C	0.54 x "	6.50	1.27 x 2.56 1.11 x 3.82	3.25 4.22	2.61	1.79	17.89	30.7
1C	"	6.50	1.27 x 2.56 1.11 x 3.82	3.25 4.22	2.61	2.60	19.72	49.5
3Cell	0.56 x 2.25 x 1.35	1.55	0.10 x 2.25 0.64 x 1.91	0.27 1.22	1.06	1.09	5.26	5.3
2C	0.54 x "	1.49	1.27 x 1.21 1.11 x 1.91	1.54 2.12	1.06	1.79	8.10	13.3
1C	"	1.49	1.27 x 1.21 1.11 x 1.91	1.54 2.12	1.06	2.60	8.81	22.2
3Cell	0.56 x 2.05 x 2.71	3.11	0.10 x 2.05 0.64 x 1.21	0.27 0.97	1.47	0.40	6.02	6.0
2C	0.54 x "	3.00	1.27 x 3.11 1.11 x 1.21	3.95 1.34	1.47	0.66	10.48	16.4
1C	"	3.00	1.27 x 3.11 1.11 x 1.21	3.95 1.34	1.47	0.99	16.75	27.2
3Cell	0.56 x 4.1 x 3.87	8.89	1.64 x 3.82 1.27 x 2.56	6.26 3.25	2.93	0.53	22.07	22.8
2C	0.54 x "	8.57	1.64 x 3.82 1.27 x 2.56	6.26 3.25	2.93	1.05	22.06	44.8
1C	"	8.57	1.64 x 3.82 1.27 x 2.56	6.26 3.25	2.93	1.57	22.60	67.4
3Cell	0.56 x 2.15 x 2.52	2.81	0.10 x 2.15 0.64 x 1.21	0.27 0.97	1.38	0.40	5.69	5.17
2C	0.54 x "	2.79	1.64 x 4.3 1.11 x 1.21	7.05 1.34	1.38	0.66	13.45	19.5
1C	"	2.79	1.64 x 4.3 1.11 x 1.21	7.05 1.34	1.38	0.99	14.18	33.7
3Cell	0.51 x 4.1 x 1.16	2.93	0.10 x 4.1 0.15 x 3.82	0.41 0.57	1.62	0.40	4.86	4.9
2C	0.49 x "	2.33	0.15 x 3.82 0.15 x 3.82	0.57 0.57	1.62	0.66	5.13	10.0
1C	"	2.33	0.15 x 3.82 0.15 x 3.82	0.57 0.57	1.62	0.99	5.51	15.6
1Cell	0.56 x 2.05 x 1.67	1.82	0.10 x 2.05	0.27	0.52		2.45	18.0
3Cell	0.51 x 2.05 x 1.16	1.21	0.10 x 2.05	0.27	0.47	0.40	2.95	3.0
2C	0.54 x "	1.21	1.64 x 1.91	3.13	0.97	0.66	6.67	9.6
1C	"	1.21	1.64 x 1.91	3.13	0.97	0.99	7.00	16.6
	0.56 x 2.05 x 1.67	1.82			0.52		2.45	19.1

	ROOF		WALL		BEAM	COLUMN	W	F
1CE5	0.56 x 2.15 x 3.7A	3.53			1.72	0.53		6.1
CH16					1.30	0.53		1.8
1CA1	0.51 x 1.16 x 1.16	0.5A	0.10 x 2.3 1.37 x 2.04	0.23 2.7A	0.69	2.65		7.1
1CA2	0.51 x 2.32 x 3.7A	4.70	0.10 x 2.3 1.37 x 2.14	0.23 2.7A	2.64	2.65		13.0
1CA9	0.51 x 2.32 x 1.16	1.37	0.10 x 2.3 1.37 x 2.04	0.23 2.7A	1.03	2.65		8.1
1CB1	0.51 x 1.16 x 3.7A	2.35	0.10 x 4.0 1.37 x 3.70	0.40 5.06	1.26	2.65		11.7
1CB4	0.51 x 3.46 x 3.7A	7.05	1.21 x 4.05	7.11	2.91	0.90		10.0
1CB6	0.51 x 2.32 x 3.7A	4.70	0.10 x 4.0 1.21 x 2.18 1.37 x 3.70 0.10 x 4.0	0.40 2.64 5.06 0.40	2.76	2.65		17.4
1CC1	0.51 x (3.46 x 1.79 - 5.85)	5.13 6.07	1.37 x 3.70	5.06	4.40	2.65		20.6
1CC4	0.51 x 3.46 x 6.7A	11.16	1.21 x 4.25	5.07	10.14	2.03		35.3
1CC6	0.51 x (2.32 x 5.13 - 2.6A)	4.70 1.60	0.10 x 4.0 1.37 x 3.70	0.40 5.06	4.74	2.65		14.2
1CB1	0.51 x 1.16 x 2.32	1.37	0.10 x 2.3 1.37 x 2.04	0.23 2.7A	0.69	2.65		7.7
1CB6	0.51 x 1.16 x 2.32	1.37	0.10 x 2.3 1.37 x 2.04	0.23 2.7A	1.61	2.65		10.3
1CE4	0.51 x 5.4 x 6.2A	18.61			11.04	1.61		31.3

### 3.4 SEISMIC FORCE

#### DOMITORY

ROOF	$0.51 \times 36.9 \times 7.73$	145.5	
PARAPET	$0.10 \times 36.9$	3.6	
WALL	$0.64 \times (36.9 \times 9 + 2.43)$	23.6	
	$0.54 \times 1.5 \times 36.5$	29.6	
	$0.46 \times 1.38 \times 41.0$	26.0	
BEAM	$0.39 \times 121.6$	47.4	
	$0.51 \times 51.3$	26.2	
COLUMN	$0.51 \times 2.15 \times 10$	11.0	
	$0.30 \times 1.75 \times 10$	5.3	
	$0.19 \times 2.15 \times 10$	4.1	321.6

2ND FLOOR	$0.47 \times (36.9 \times 7.73 + 2.18)$	135.1	
WALL	$0.67 \times (36.9 \times 9 + 2.43)$	26.3	
	$0.54 \times 3.0 \times 36.5$	59.1	
	$0.66 \times 2.72 \times 41.0$	51.9	
BEAM		67.6	
COLUMN	$0.51 \times 3.5 \times 10$	17.9	
	$0.30 \times 2.15 \times 10$	10.5	
	$0.19 \times 3.5 \times 10$	6.7	377.1

1ST FLOOR		377.1	
ROOF	$0.51 \times (4.7 \times 2.37 + 4.1 \times 1.67)$	6.7	
BEAM	$0.31 \times 8.2$	2.5	386.6

	W	K	$\frac{W}{K}$	$\frac{W}{K}$
3	321.6	0.1	322.2	322.2
2	377.1	"	377.7	69.9
1	386.6	"	387.7	108.6

LAUNDRY

ROOF	$0.41 \times 4.1 \times 12.02$	25.1	
WALL	$0.41 \times 1.15 \times 13.7$	6.5	
	$0.15 \times 1.15 \times 13.7$	3.2	
BEAM	$0.24 \times 35.7$	12.1	
COLUMN	$0.19 \times 1.9 \times 8$	2.1	$51.0 \times 0.1 = 5.1$

DINING

ROOF	$0.46 \times 11.6 \times 20.52$	109.5	
	$0.46 \times 2.7 \times 7.32$	2.9	
WALL	$1.37 \times 47.4$	64.9	
	$1.21 \times 18.1$	21.9	
	$0.10 \times 64.2$	6.4	
BEAM	$0.24 \times 64.2$	21.9	
	$0.51 \times 17.1$	37.6	
	$0.61 \times 21.4$	13.3	
COLUMN	$0.41 \times 2.6 \times 22$	24.2	
	$0.31 \times 2.6 \times 1$	0.8	
	$0.34 \times 2.6 \times 1$	1.0	
	$0.19 \times 2.6 \times 1$	0.5	$311.1 \times 0.1 = 31.1$

FENCE

WALL	$0.15 \times 1.4 \times 3.82$	0.8	
BEAM	$0.24 \times 3.82$	1.3	
COLUMN	$0.19 \times 1.4$	0.3	$2.4 \times 0.1 = 0.2$

## WIND PRESSURE

$$q_s = 60 \sqrt{z_g} = 93 \text{ N/m}^2$$

$$q = 93 \times 2.0 \times 0.5 = 93$$

$$w = 93 \times 4.1 \times 2.6 = 1067 \text{ N} = 1.1 \text{ T}$$

3-5 STIFFNESS RATIO

	b x D	J <sub>10</sub>	l	K <sub>10</sub>	α	k <sub>c</sub>
2C	28 x 175	98.1	350	28.1		2.81
	75 x 28	13.7	"	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	98.4	390	25.2		2.52
	75 x 28	13.7	"	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 1.75	1.74
	"	"	232	12.6	1.27 1.44	1.37
	"	"	270	10.6	1.25	1.45
	28 x 175	98.4	541	14.2	1.53 1.82	2.31
FG	35 x 90	212.6	410	51.9		5.19
	"	"	232	91.6		9.16
	"	"	270	73.7		7.37
	"	"	541	39.3		3.93
C	28 x 28	5.1	280	1.8		0.18
4C	28 x 45	29.2	334	4.7	1.35	1.17
FG	35 x 75	123.0	410	30.0		3.00
			334	36.6		3.66

10<sup>3</sup> = 10<sup>3</sup>

1.04  
1.60  
1.45  
2.73

	b x D	J <sub>104</sub>	l	K <sub>104</sub>	q	R <sub>e</sub>
C	20 x 115	984	520	1.84		1.84
	25 x 20	13.1	"	2.6		0.26
	20 x 20	5.1	"	1.0		0.10
	40 x 40	21.3	"	4.1		0.41
	40 x 8	12.5	"	2.4		0.24
G	20 x 150	29.2	232	12.6	1.33 1.25	2.20
	"	"	562	5.2	1.56	0.51
	20 x 115	984	464	21.2	1.67	3.45
	"	"	794	12.4	1.95	2.41
	20 x 90	170.1	696	24.4	1.86	4.51
FG	"	"	464	36.6	1.65	6.02
	35 x 90	212.6	232	41.6		4.16
	"	"	464	45.8		4.58
	"	"	562	37.8		3.78
	"	"	696	30.5		3.05
			794	26.0		2.60

$K_D = 10^3$

1.67

Ⓐ

	1.04	1.04	1.04	1.04	1.04	
0.15	0.15	0.15	0.15	0.15	0.15	350
1.04	1.04	1.04	1.04	1.04	1.04	
0.15	0.15	0.15	0.15	0.15	0.15	
1.04	1.04	1.04	1.04	1.04	1.04	350
0.15	0.15	0.15	0.15	0.15	0.15	390
5.19	5.19	5.19	5.19	5.19	5.19	
5.19	5.19	5.19	5.19	5.19	5.19	

350
350
390

Ⓒ

	1.24	1.24	1.24	1.24	1.24	
0.15	0.23	0.23	0.23	0.23	0.23	
1.24	1.24	1.24	1.24	1.24	1.24	
0.15	0.23	0.23	0.23	0.23	0.23	
1.24	1.24	1.24	1.24	1.24	1.24	
0.15	0.23	0.23	0.23	0.23	0.23	
5.19	5.19	5.19	5.19	5.19	5.19	
5.19	5.19	5.19	5.19	5.19	5.19	

Ⓙ

	1.45	1.45	1.60	
2.81	2.15	2.15	0.15	
1.45	1.45	1.60		
2.81	0.15	2.15	0.15	
1.45	1.45	1.60		
2.82	0.15	0.15	0.15	
7.89	7.89	9.15		

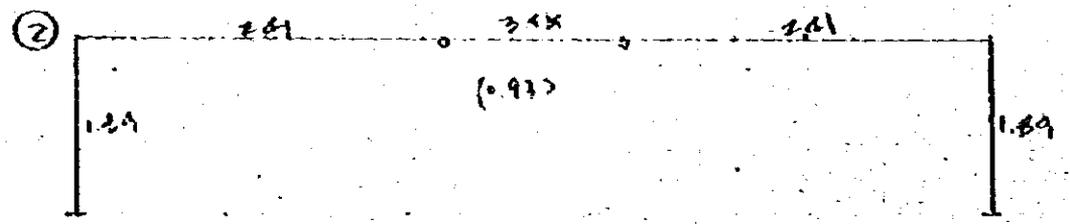
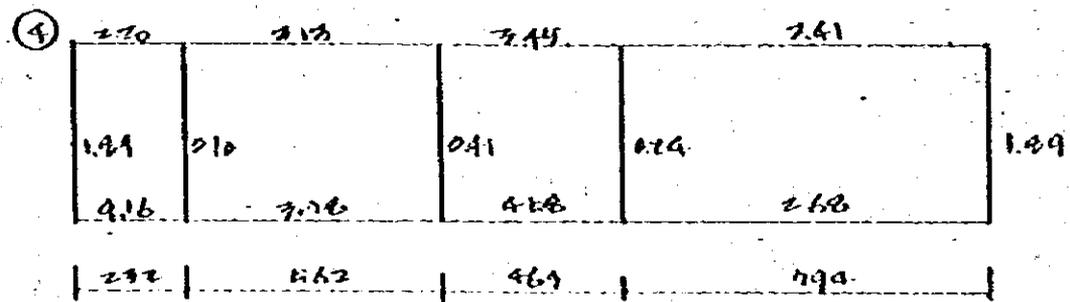
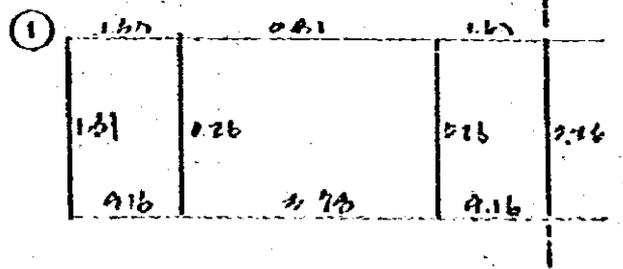
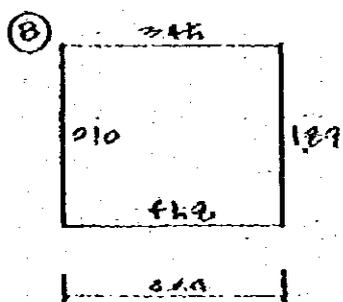
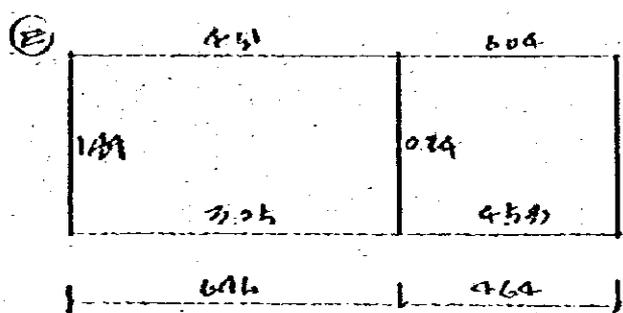
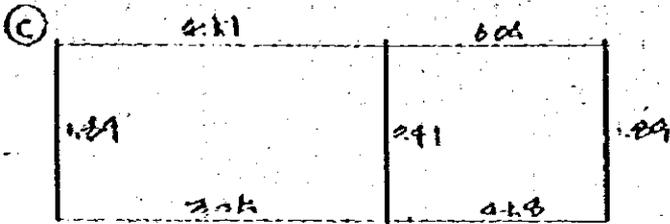
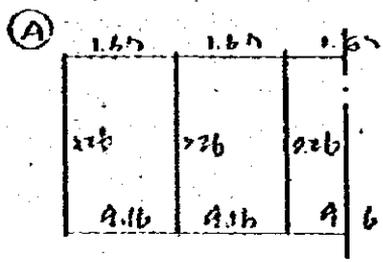
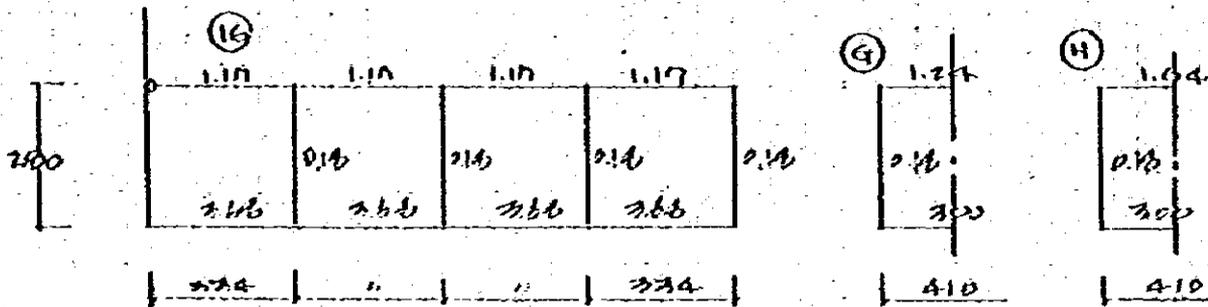
Ⓑ

	1.04	1.04	1.06	1.06	1.04	
0.39	0.39	0.39	0.39	0.39	0.39	
1.04	1.04	1.06	1.06	1.04	1.04	
0.39	0.39	0.39	0.39	0.39	0.39	
1.04	1.04	1.06	1.06	1.04	1.04	
0.39	0.39	0.39	0.39	0.39	0.39	
5.19	5.19	5.19	5.19	5.19	5.19	
5.19	5.19	5.19	5.19	5.19	5.19	

Ⓚ

	3.31	1.87	
2.81		2.39	0.15
3.31	1.47		
2.81	0.39	0.39	0.15
3.31	1.47		
2.82	0.39	0.39	0.15
3.43	4.16		

2.10				4.10	5.41	2.81
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3-6 CALCULATION OF STRESS

1. D 4

B	697	1277	227	1073	767	533	
E	0.12	0.13	0.12	0.19	0.22	0.20	Σ 0
A	0.6	0.7	0.6	1.0	1.2	1.5	77.2
697	0.45	0.45	0.45	0.45	0.43	0.45	
	697	1277	227	1073	767	533	
	0.12	0.13	0.12	0.19	0.22	0.20	
1A	1.5	1.4	1.4	2.2	2.6	3.3	69A
1.50	0.50	0.50	0.50	0.40	0.50		
	1073	933	1131	297	1599		
	0.11	0.12	0.11	0.19	0.24	0.23	1086
2.1	2.3	2.1	3.1	4.6	5.4		
0.55	0.55	0.55	0.55	0.55	0.55		

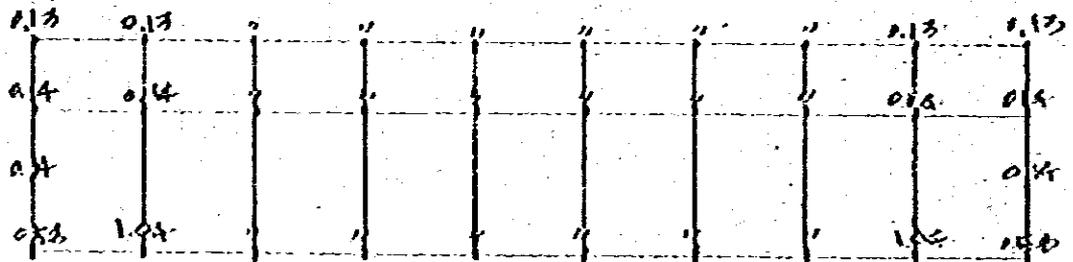
0.12	0.13	"	"	"	"	"	"	0.13	0.12
0.12	0.19	"	"	"	"	"	"	0.19	0.12
0.22	1.20	"	"	"	"	"	"	0.20	0.22

Σ D = 692

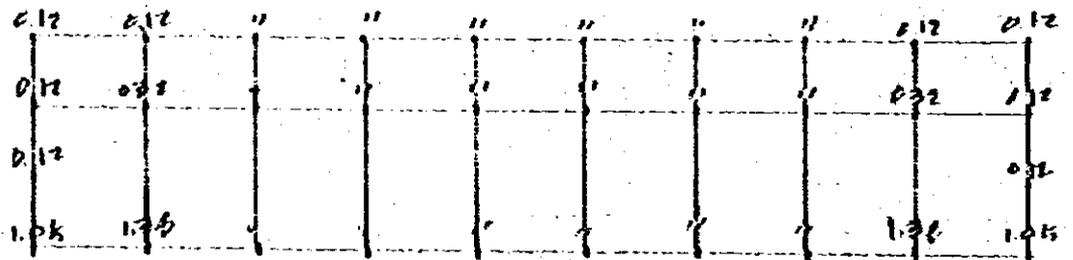
0.11	0.12	"	"	"	"	"	"	0.12	0.11
0.11	0.19	"	"	"	"	"	"	0.19	0.11
0.24	0.28	"	"	"	"	"	"	0.28	0.29

Σ D = 564

D y Q h	152	19.33	2033	1067	1110	1316	12A1
	0.50	0.14	0.14	0.13	1.04	0.34	0.13
	1.3	2.3	0.3	0.3	2A	0.8	0.3
	0.30	0.25	0.25	0.25	0.36	0.25	0.25
	0.32	19.33	2032	1017	1110	13.26	12.47
	0.50	0.14	0.14	0.13	1.04	0.34	0.13
	2A	0.7	0.7	0.6	5.2	1.7	0.6
	0.25	0.15	0.20	0.25	0.45	0.20	0.25
	0.50	22.31	23.56	12.31	12.1	14.30	14.36
	1.04	0.12	0.12	0.12	1.30	0.32	0.12
	6.6	0.7	0.7	0.7	2.6	2.0	0.7
	0.20	0.25	0.25	0.25	0.25	0.25	0.25



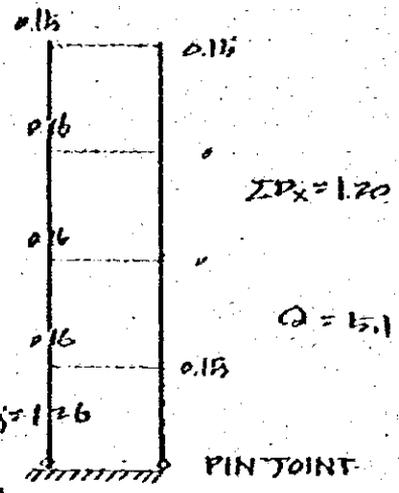
$\Sigma D = 14.06$



$\Sigma D = 17.30$

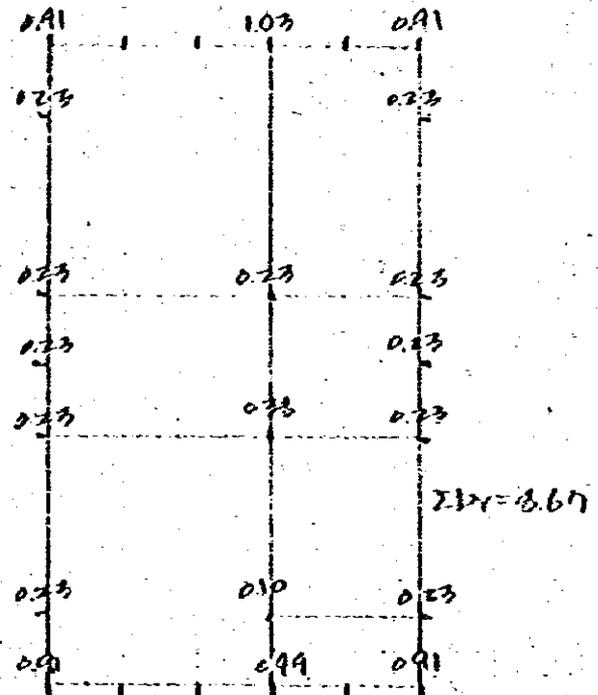
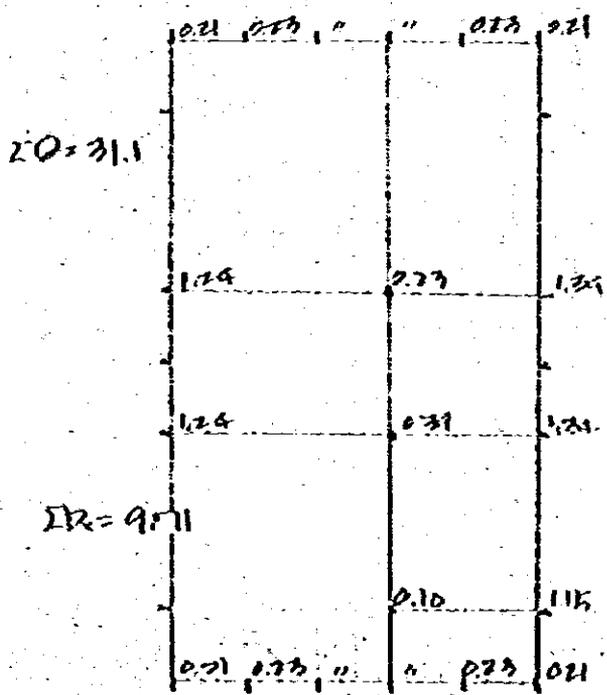
11317	12.0	0.40
0.16	0.16	0.15
0.6	0.6	0.6
0.55	0.55	0.55

1.24	0.15
0.15	0.15
0.6	0.6
0.55	0.55

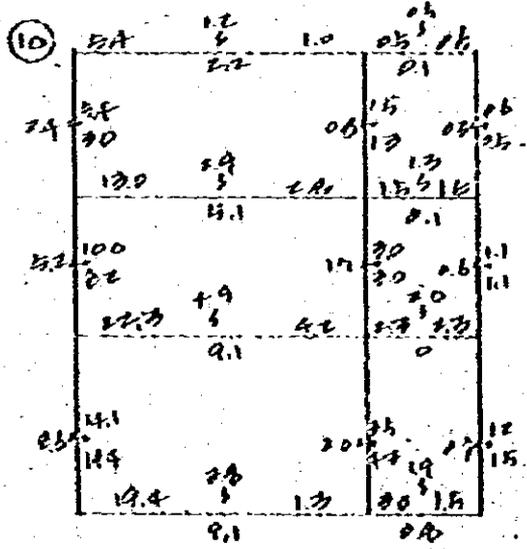
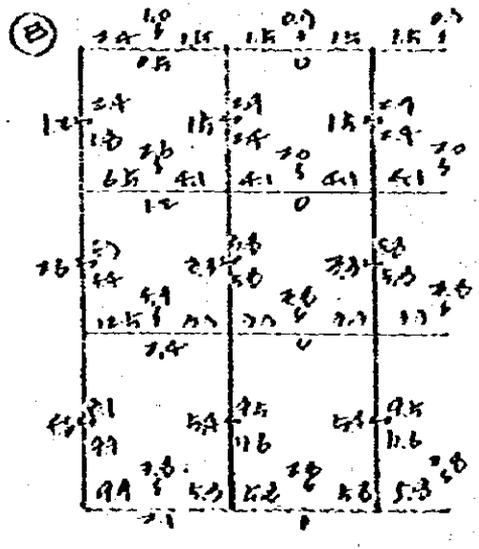
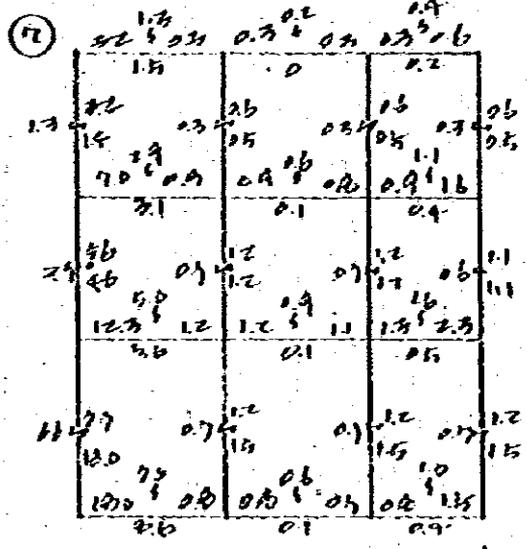
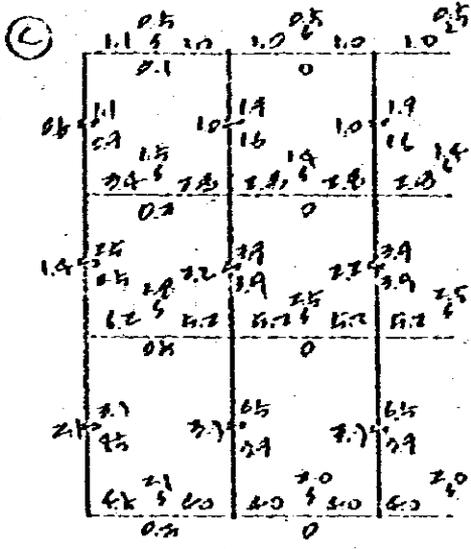
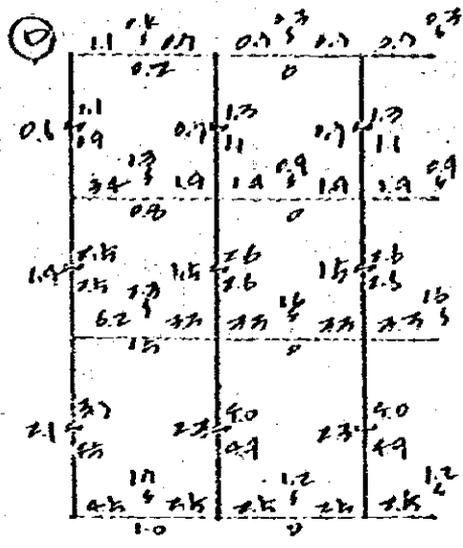


6.42	12.05	9.55	1.53	2.34	25.73	3.20	4.346
0.21	0.23	0.10	1.15	1.24	0.39	1.34	0.23
0.7	0.7	0.3	3.7	4.0	1.2	4.3	0.7
0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55

0.00	9.54	9.55	12.05	1.16	57.73	16.05	24.42	1.20	0.19
0.91	0.23	0.23	0.23	0.91	0.10	0.38	0.23	1.03	0.23
3.7	0.6	0.6	0.6	3.6	0.4	1.4	0.6	3.7	0.7
0.60	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0

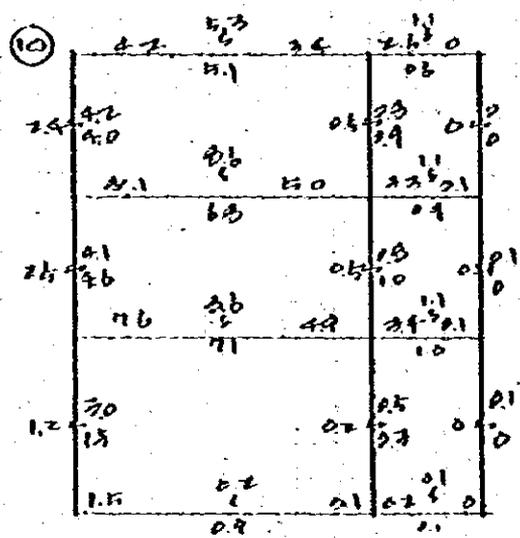
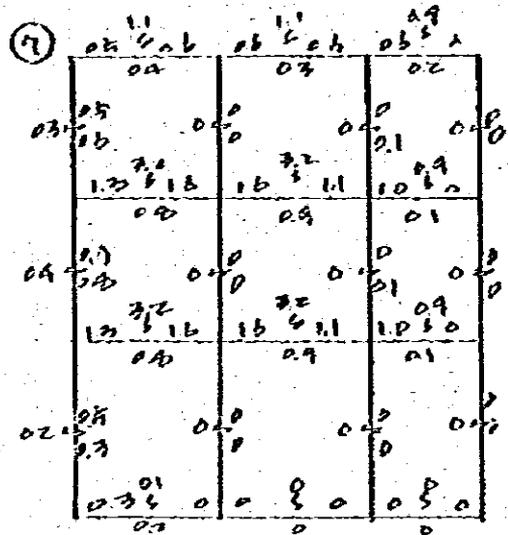
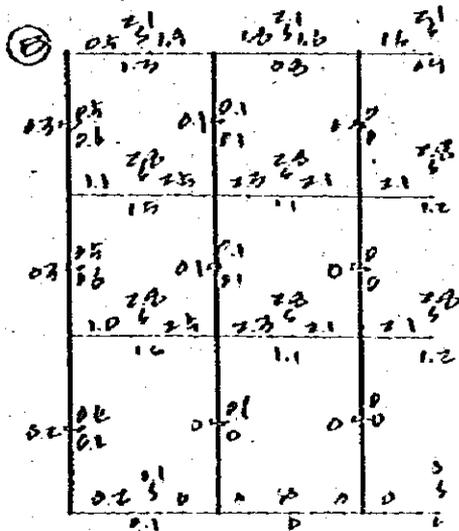
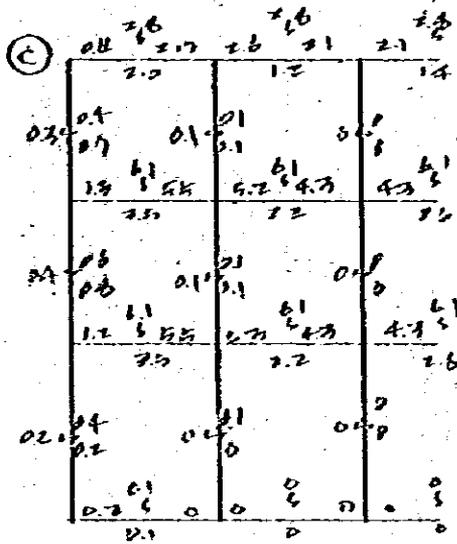
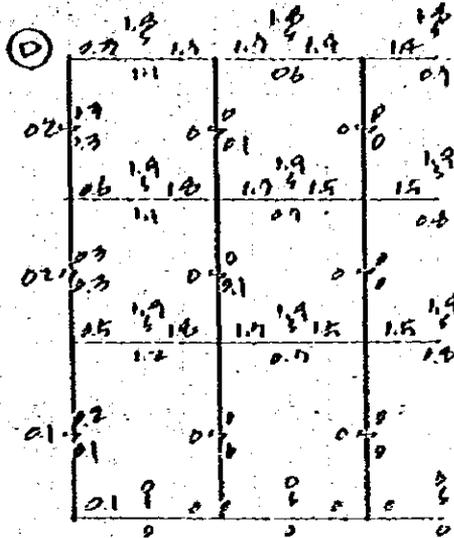


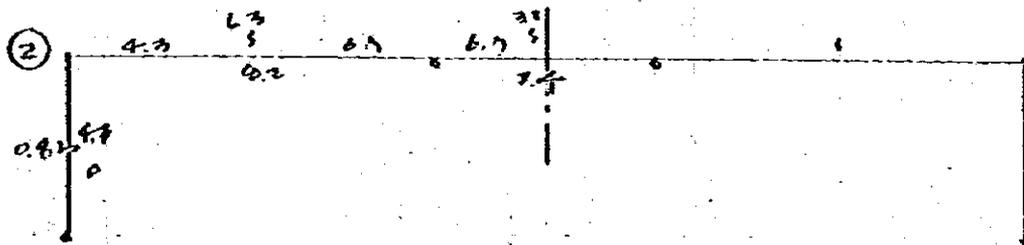
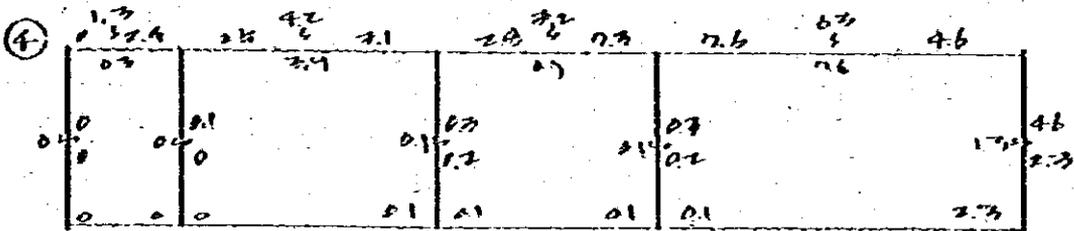
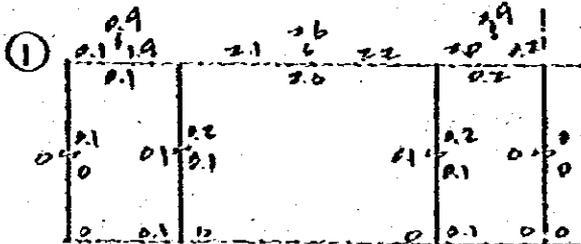
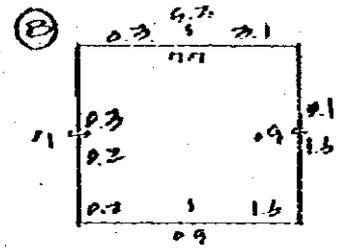
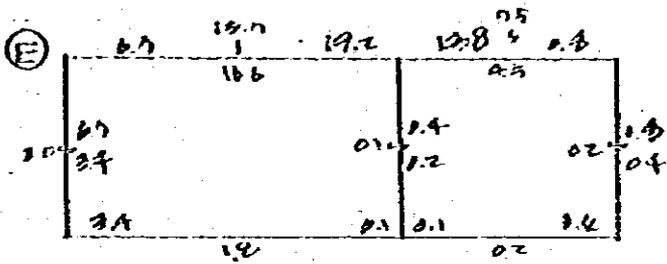
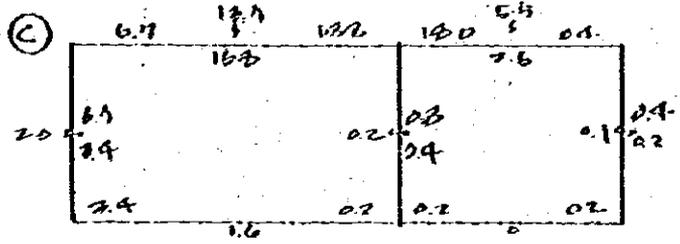
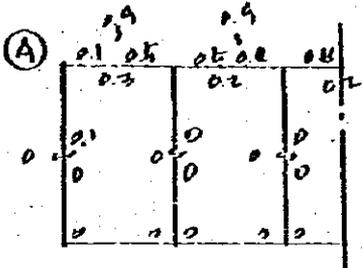
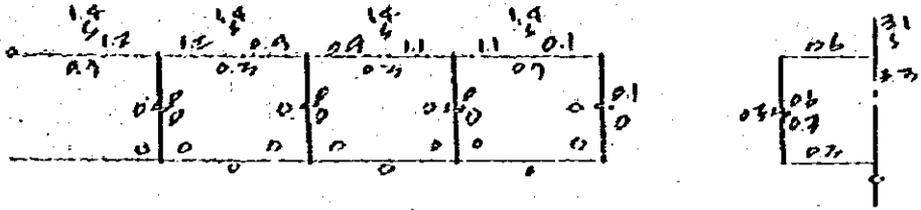
STRESS DIAGRAM OF SEISMIC FORCE





STRESS DIAGRAM OF VERTICAL LOAD





3-7 DESIGN OF SECTION

BEAM

REF	$M_{ED}$	$M_{CC}$	$M_{EF}$	$Q$	$M_{FE}$	$M_{CE}$	$Q$
L	0.5	1.3	1.9	2.1	1.0	0.9	2.1
E	2.4	0.5	1.5	1.0	1.5	0	0.9
S	2.9		2.4	4.1	3.3		2.5

$b \times D = 24 \times 50$

A	2.4	1.7	2.6		2.6	1.1	
M	2-D16	2-D16	2-D16		2-D16	2-D16	

REF	$M_{ED}$	$M_{CC}$	$M_{EF}$	$Q$	$M_{FE}$	$M_{CE}$	$Q$
L	1.1	1.5	2.5	2.6	2.3	1.2	2.8
E	6.5	1.2	4.1	2.6	4.1	0	2.0
S	7.6	2.5	6.6	9.0	6.4		6.8

$b \times D = 27 \times 50$

A	6.4	2.3	5.6		5.4	1.5	
M	4-D16	2-D16	4-D16		4-D16	2-D16	

REF	$M_{ED}$	$M_{CC}$	$M_{EF}$	$Q$	$M_{FE}$	$M_{CE}$	$Q$
L	1.0	1.6	2.5	2.8	2.3	1.2	2.8
E	12.5	2.9	7.7	4.9	7.7	0	3.8
S	13.5	4.0	10.2	12.6	10.0		10.9

$b \times D = 28 \times 50$

A	11.4	3.4	8.3		8.5	1.5	
M	2-D19 2-D22	2-D19	4-D19		4-D19	2-D19	

$\Delta D = 12.6 - 9.9 = 2.7$

$\Delta Q / b_j = 2.45$        $\rho_w = 0.36$

$\rho_w = 2.143 / 28 \times 1.36 = 1.412 \rightarrow 10\%$

$\Delta D = 10.5 - 9.9 = 0.6$

$\Delta Q / b_j = 0.45$        $\rho_w = 0.23$

$\rho_w = 2.22 \rightarrow 15\%$

$24 < 17 < 16$	$\mu_{OE}$	$\mu_C$	$\mu_{FE}$	$\sigma$	$\mu_E$	$\mu_C$	$\sigma$
L	0.4	2.0	2.5	2.8	2.6	1.4	2.8
E	1.1	0.1	1.0	0.5	1.0	0	0.5
S	1.5						

$2 \times 2 = 2.8 \times 1.50$

A	1.3	2.5	3.4		3.3	1.8	
n	2-016	2-016	2-016		2-016	2-016	

$24 < 17 < 16$	$\mu_{OE}$	$\mu_C$	$\mu_{FE}$	$\sigma$	$\mu_E$	$\mu_C$	$\sigma$
L	1.3	3.5	5.5	6.1	5.2	2.6	6.1
E	3.4	0.3	2.8	1.5	2.8	0	1.4
S	4.7		0.3	9.1	0.0		0.9

$6 \times 2 = 2.8 \times 1.50$

A	4.0	4.5	7.0		6.6	3.3	
n	4-016	4-016	4-016		4-016	2-016	

$24 < 17 < 16$	$\mu_{OE}$	$\mu_C$	$\mu_{FE}$	$\sigma$	$\mu_E$	$\mu_C$	$\sigma$
L	1.2	3.5	5.5	6.1	5.3	2.6	6.1
E	6.2	0.5	5.2	2.8	5.2	0	2.5
S	11.4		10.5	11.7	10.5		11.1

$6 \times 2 = 2.8 \times 1.50$

A	6.3	4.5	9.1		8.9	3.3	
n	4-019	2-019	4-019		4-019	2-019	

$\Delta O = 11.7 - 9.9 = 1.8$

$\Delta P / \Delta j = 1.64 \quad P_{20} = 0.31$

$b_{10} \times 2 = 1.3 / 1.29 < 0.31 = 1.6k \rightarrow 11.0$

Fig. 11-16	$\mu_{DE}$	$\mu_C$	$\mu_{DE}$	$\phi$	$\mu_E$	$\mu_C$	$\phi$
L	0.3	1.1	1.7	1.0	1.7	0.7	1.3
E	1.1	0.2	0.7	0.5	0.7	0	0.3
S	1.4						

$b \times b = 20 \times 50$

A	1.2	1.4	2.2		2.2	0.9	
n	2-013	2-013	2-013		2-013	2-013	

Fig. 11-16	$\mu_{DE}$	$\mu_C$	$\mu_{DE}$	$\phi$	$\mu_E$	$\mu_C$	$\phi$
L	0.6	1.1	1.8	1.9	1.7	0.8	1.9
E	3.4	0.8	1.9	1.3	1.9	0	2.9
S	4.0	1.9	3.7	4.5	3.8		3.7

$b \times b = 30 \times 50$

A	3.4	1.6	3.1		3.2	1.0	
n	2-016	2-016	2-016		2-016	2-016	

Fig. 11-16	$\mu_{DE}$	$\mu_C$	$\mu_{DE}$	$\phi$	$\mu_E$	$\mu_C$	$\phi$
L	0.5	1.2	1.8	1.9	1.7	0.8	1.9
E	6.2	1.5	3.7	2.3	3.3	0	1.6
S	6.7	2.7	5.1	6.5	5.0		5.1

$b \times b = 29 \times 50$

A	5.7	2.3	4.3		4.2	1.0	
n	2-019	2-019	2-019		2-019	2-019	

REF ID	ME	MC	ME	Q	ME	MC	Q
L	0.5	0.9	0.6	1.1	0.6	0.3	1.1
E	3.2	1.5	0.3	0.3	0.3	0	0.9
S	3.7	1.9	0.9	1.7	0.9		1.9

bxd = 2.2b x 1.5d

A	3.1	1.6	0.8		0.8	0.4	
M	2.2b	2.2b	2.2b		2.2b	2.2b	

REF ID	ME	MC	ME	Q	ME	MC	Q
L	1.3	0.8	1.6	3.2	1.6	0.9	3.2
E	7.0	3.1	0.9	2.9	0.9	0.4	1.1
S	4.3	3.9	2.5	9.0	2.5		5.4

bxd = 2.2b x 1.5d

A	7.0	3.7	2.1		2.1	1.1	
M	4.2b	2.2b	2.2b		2.2b	2.2b	

REF ID	ME	MC	ME	Q	ME	MC	Q
L	1.3	0.8	1.6	3.2	1.6	0.9	3.2
E	12.3	5.6	1.2	5.0	1.2	0.5	1.6
S	13.6	6.4	2.8	13.2	2.8	1.9	6.4

bxd = 2.2b x 1.5d

A	11.5	5.4	2.4		2.4	1.2	
M	2.2b	2.2b	2.2b		2.2b	2.2b	

$$\Delta Q = 13.2 - 9.9 = 3.3$$

$$\Delta Q / Q = 3.3 / 10 = 33\% \quad P10 = 0.40$$

$$b12 \times 1.93 / 1.1 \times 0.50 = 12.7 \rightarrow 10.0$$

2410 RAD	NOE	TC	NOE	Q	NOE	TC	NOE	Q	
L	4.2	5.1	3.9	3.3	2.6	0.6	0	1.1	
E	5.4	2.2	1.0	1.2	0.5	0.1	0.6	0.5	
S	9.6						0.6	2.1	
bxd = 24x175					24x150				
A	5.1	4.2	2.6		3.7	0.6	0.5		
M	4-D16	3-D16	2-D16		2-D16	2-D16	2-D16		

2410 RAD	NOE	TC	NOE	Q	NOE	TC	NOE	Q	
L	8.1	6.8	5.0	2.6	3.3	0.9	0.1	1.1	
E	14.0	5.1	2.6	2.9	1.5	0.1	1.6	1.3	
S	21.1	11.9	7.6	14.9	4.8		1.7	3.7	
bxd = 24x175					24x150				
A	11.5	6.5	4.2		4.1	1.1	1.4		
M	2-D19	2-D19	2-D19		2-D19	2-D19	2-D19		

2410 RAD	NOE	TC	NOE	Q	NOE	TC	NOE	Q	
L	12.6	10.1	4.9	4.6	3.9	1.0	0.1	1.1	
E	22.3	9.1	4.2	4.9	2.3	0	2.3	2.0	
S	29.4	16.2	9.1	12.9	5.7		2.4	5.1	
bxd = 24x175					24x150				
A	16.3	8.6	5.0		4.6	1.3	2.0		
M	2-D22	2-D22	2-D22		2-D22	2-D22	2-D22		

$\Delta Q = 14.9 - 11.9 = 3.0$   
 $\Delta Q / Q = 1.75 \quad p_w = 0.30$   
 $D_{10} x = 14.3 / 22 \times 2.70 = 1.75 \rightarrow 1.5 \text{ (Q)}$

LAUNDRY

Rate	RE	RC	Q	Rate	RE	RC	Q
L	0.6	3.3	3.1	L	1.2	0.7	1.9
E	0.0	0	0.4	E	0.5	0.2	0.3
S	1.4			S			
b < D = 2.8 x 50							
A	1.2	4.2			1.5	0.9	
n	2-D16	2-D16			2-D16	2-D16	

DINING ROOM

Rate	RE	RC	RE	Q	RE	RC	Q
L	0.1	0.3	0.5	0.9	2.5	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 < D = 2.8 x 50							
A	1.4	0.6	1.1		1.1	0.3	
n	2-D16	2-D16	2-D16		2-D16	2-D16	

Rate	RE	RC	RE	Q
L	0.3	1.7	3.1	5.3
E	0.5	4.0	6.7	2.0
S	1.0	11.9	11.8	9.3
b < D = 2.8 x 75				
A	0.5	6.4	6.4	
n	2-D22	2-D22	2-D22	

REGIAND	TRPF	TRC	TRSE	Q	TRSE	TRC	TRPF	Q
L	6.7	16.8	18.8	12.7	18.0	2.6	0.9	13.5
E	9.0	4.1	1.2	1.5	1.6	4.3	10.1	2.5
S	15.7					6.9	10.5	10.5

$b \times D = 28 \times 90$

Q	17.0	11.3	12.6		12.1	3.1	4.7	
M	$\frac{2-022}{2-015}$	$\frac{4-022}{4-022}$	$\frac{4-022}{4-022}$		$\frac{4-022}{4-022}$	$\frac{4-022}{4-022}$	$\frac{2-022}{2-022}$	

$Q = 13.700 / (0.3 \times 12.0) = 15.4$

$CO = 13.7 - 12.5 = 1.2$

$CO/b_j = 0.17$      $PI = 0.29$      $\Rightarrow 10 \times 2 = 14.3 / 0.6 \times 0.29 = 21.3 \rightarrow 11.0$

REGIAND	TRPF	TRC	TRSE	Q	TRSE	TRC	TRPF	Q
L	6.7	16.6	19.2	12.7	19.0	4.5	0.8	17.5
E	9.9	5.4	0.7	1.5	0.9	4.6	10.1	2.1
S	16.1					9.1	10.9	12.2

$b \times D = 28 \times 90$

Q	17.2	11.2	12.9		12.6	4.1	4.9	
M	$\frac{2-022}{2-015}$	$\frac{4-022}{4-022}$	$\frac{4-022}{4-022}$		$\frac{4-022}{4-022}$	$\frac{4-022}{4-022}$	$\frac{2-022}{2-022}$	

REGIAND	TRPF	TRC	TRSE	Q	TRSE	TRC	Q
L	0.1	0.1	1.9	0.9	2.0	2.0	2.6
E	6.9	2.8	1.3	2.6	1.3	0	0.2
S	17.0	2.9	3.2	0.1	3.3		

$b \times D = 28 \times 50$

Q	5.9	2.5	2.7		2.8	2.5	
M	$\frac{4-016}{2-016}$	$\frac{2-016}{2-016}$	$\frac{2-016}{2-016}$		$\frac{2-016}{2-016}$	$\frac{2-016}{2-016}$	

REZANG	120E	12C	12E	Q	12E	12C	Q
L	4.3	0.2	6.7	6.3	6.7	2.1	3.2
E	2.7	1.4	1.0	0.6	1.0	0	0.6
D	2.0						

6x0 = 20 x 75

a	4.4	6.7	5.5	5.5	2.0
n	2-219	2-219	2-219	2-219	2-219

REZANG

	120E	12C	12E	Q	12E	12C	Q	12E	12C	Q	12E	12C	Q	
L	0	0.3	2.4	1.3	3.1	3.9	4.2	2.0	0.7	3.2	7.6	7.6	4.6	6.3
E	2.1	4.0	0.1	3.3	1.6	0.6	0.4	1.7	0.4	0.6	0.9	2.9	2.1	1.2
D	4.4	4.3		2.9	4.7			4.5	1.1			11.5	13.3	
	6x0 = 20 x 150			20 x 75			20 x 75			20 x 75				
A	7.1	3.6	3.0		2.5	3.2		2.4	2.6		6.7	6.3	7.2	
n	4-219	2-219	2-219		2-219			2-219	2-219		4-219		4-219	
		2-219			2-219			2-219			4-219		4-219	

COLUMN

2C <sub>16</sub>	x	P	Y	x	M	Y	x	Q	Y
L		5.3		0.5	0.6	0.6	0.7	0.7	
E	10		1.3	2.4	1.0	2.2	1.2	1.3	
S	6.3	4.7	6.6	4.0	2.9	3.7	2.7	2.9	

$b \times D = 2.8 \times 17.5$        $0.9 \times 6 = 16.0$

	x	P/10	Y	x	P/100	Y	x	P <sub>A</sub>	Y	x	A <sub>A</sub>	Y	x	M	Y
L		2.5		1.3	0.4		0.02	-							
S	3.0	2.0	3.1	1.9	1.2	2.4	0.22	0.10	4.6	2.1	2.019	2.019			

2C <sub>16</sub>	x	P	Y	x	M	Y	x	Q	Y
L		13.3		0.5	0.5	0.7	0.8	0.7	0.4
E	2.6	4.1	4.7	4.4	10.0	8.2	2.6	5.2	
S	16.9	9.7	17.4	9.2	10.7	5.5	10.8		

$b \times D = 2.8 \times 9.5$

	x	P/10	Y	x	P/100	Y	x	P <sub>A</sub>	Y	x	A <sub>A</sub>	Y	x	M	Y
L		6.7		1.3	1.5		-	-							
S	8.3	4.3	8.3	4.4	11.1	6.8	0.38	0.25	0.0	4.2	3.59	2.019			

1C <sub>16</sub>	x	P	Y	x	M	Y	x	Q	Y	
L		22.2		0.4	2.2	3.0	1.5	0.2	1.2	
E	8.5	9.0	9.1	4.9	14.1	19.9	4.6	8.6		
S	20.5	12.7	21.7	11.0	8.5	17.1	10.1	20.9	9.8	18.9

$b \times D = 2.8 \times 17.5$        $4 \times Q_A = 13.6$        $4 \times Q_A = 15.4$

	x	P/10	Y	x	P/100	Y	x	P <sub>A</sub>	Y	x	A <sub>A</sub>	Y	x	M	Y
L		10.6		0.4	1.9		-	-							
S	14.5	6.5	15.9	11.0	12.1	10.9	21.5	13.7	0.42	0.29	13.0	4.1	5.019	2.019	17.4

$\Delta Q = 13.4 - 15.4 = -2.0$   
 $60/3 = 1.75$   
 $P_{10} = 0.22$   
 $D_{10} = 15.9 \rightarrow 10 \text{ (D)}$

2C114	x P y	x R y	x Q y
L	12.0	0.1 4.2 4.0	0.1 2.9
E	0.7 12	2.9 5.4 3.4 3.0	1.5 2.4
S	13.1 14.0 12.5 11.6	3.0 4.2	3.1 7.2

$b \times b = 2.9 \times 7.5$

	x P/10 y	x R/10 y	x P1 y	x Q1 y	x R y
L	0.1	0.2 2.0	0.02		
E	1.2 0.7 5.9 5.5	0.5 5.4	0.16 0.15	0.4 3.7	2.019

2C111	x P y	x R y	x Q y
L	30.7	0.1 4.1 4.6	0.1 2.4
E	0.9 4.1	5.0 10.0 5.0 9.7	3.3 5.7
S	31.6 34.8 29.6 26.6	5.9 14.1	6.7 12.9

$b \times b = 2.0 \times 7.5$

	x P/10 y	x R/10 y	x P1 y	x Q1 y	x R y
L	1.46	0.2 2.9	-	-	
E	15.1 16.6 14.2 12.6	12.6 9.0	0.30 0.17	0.3 3.6	2.019

1C111	x P y	x R y	x Q y
L	49.5	0.1 3.0 1.5	0 1.2
E	2.0 9.0	0.5 14.1 11.6 19.9	5.4 4.6
S	51.5 50.5 40.5 40.5	9.6 17.1 11.6 20.9	10.0 13.4

$b \times u = 2.0 \times 7.5$

	x P/10 y	x R y	x P1 y	x Q1 y	x R y
L	23.6	0.2 1.9			
E	24.5 27.8 22.6 17.3	22.4 10.9 24.9 13.3	0.07 0.17	13.3 3.6	5.5-22.2 2.022

2C 116	P	M	Q
L	6.0	0.0	0
E	1.1	0.5	0.3
S	1.1 4.9	0.6	0.6

b x 10 = 2.20 x 2.0

	P/100	M/100 <sup>2</sup>	PA	QA	n
L	0.7	0	-		
S	1.1 5.7	2.4	0.06	0.4	2-V 19

2C 116	P	M	Q
L	16.4	0	0
E	2.4	1.2	0.7
S	1.1 13.0	1.2	1.4

b x 10 = 2.20 x 2.0

	P/100	M/100 <sup>2</sup>	PA	QA	n
L	21.0	0	-		
S	2.4 16.7	6.0	-		2-V 19

1C 116	P	M	Q
L	27.2	0	0
E	2.5	1.2 1.15	0.5
S	2.4 19.7	1.5	1.4

b x 10 = 2.20 x 2.0

	P/100	M/100 <sup>2</sup>	PA	QA	n
L	27.9	0	-		
S	2.4 19.7	0.5	-		2-V 19

$z_{C1}$	x	P	Y	x	P	Y	x	P	Y
L		5.0		0.4	0	0.1	0.3	0	
E	0.5	0.2	1.1	0.9	0.5	0.6	0.6	0.3	
S	6.2 5.2	5.9 5.7		1.6	0.6	1.5	0.6		

$b \times D = 2.8 \times 2.8$        $3.0 \times 5.1$

	x	P/b	Y	x	P/b	Y	x	P	Y	x	P	Y	x	P	Y
L		7.3		4.0	0.6	0.07	-								
S	7.0 6.6	7.6 7.3		9.0	3.4	0.26	0.05	2.0	0.4	2.19					2.19

$z_{C1}$	x	P	Y	x	P	Y	x	P	Y
L		19.5		0.6	0	0.1	0.4	0	
E	2.0	0.7	2.5	2.5	1.2	1.2	1.4	0.7	
S	21.5 19.5	22.2 19.9		3.3	1.3	3.2	1.4		

$b \times D = 2.8 \times 2.8$

	x	P/b	Y	x	P/b	Y	x	P	Y	x	P	Y	x	P	Y
L		25.0		4.5	0.6	-	-								
S	27.0 27.4	26.9 26.1		10.6	0.7	0.4	-	5.7	-	2.022					2.022

$z_{C1}$	x	P	Y	x	P	Y	x	P	Y
L		3.7		0.4	0	0	0.2	0	
E	4.7	1.4	3.7	4.5	1.2	1.5	2.1	0.7	
S	3.5 3.9	3.1 3.3		4.1	1.2	1.5	4.4	1.4	

$b \times D = 2.8 \times 2.8$

	x	P/b	Y	x	P/b	Y	x	P	Y	x	P	Y	x	P	Y
L		4.2		2.7	-	-	-								
S	4.7 3.7	4.0 4.4		2.2	4.5	1.36	-	1.06	-	2.075					2.075
				2.6	0.5	1.70	-	1.22	-	3.475					3.475

$4.7 - 2.1 - 1.21 = 1.2$        $1.0 - 0.5 = 0.5$

2C115	x	P	y	x	H	y	x	Q	y
L		22A		0.1	0.1	0.8	0.9	0.1	0.5
E	0	0.5		1.9	1.6	1.7	1.3	1.0	0.8
S	22B	22K		2.0	2.3			1.1	1.3
			22.1						

$b \times D = 22B \times 4E$        $0.04 = 10.1$

	x	P/D	y	x	H/D <sup>2</sup>	y	x	P <sub>A</sub>	y	x	Q <sub>A</sub>	y	x	M	y
L		18.1		0.4	16			-	-						
S	14.1	18.6		2.0	4.2			-	-						
			17.5												

2-D19  
2-D19

2C115	x	P	y	x	H	y	x	Q	y
L		44B		0.1	0.1	0.1	0.1	0	
E	0.1	2.3		2.9	2.9	3.0	2.2	1.7	
S	44A	42.1		4.0	3.1		4.5	3.4	
			44.3						

$b \times D = 22B \times 4E$

	x	P/D	y	x	H/D <sup>2</sup>	y	x	P <sub>A</sub>	y	x	Q <sub>A</sub>	y	x	M	y
L		25.4		0.4	0.2			-	-						
S	25.6	20.3		14.1	5.6		0.4	-	4.3						
			23.7												

2-D19  
2-D19

1C115	x	P	y	x	H	y	x	Q	y
L		67.4		0.1	0.1	0.1	0.1	0	0.2
E	0.4	5.7		6.5	2.9	3.5	2.7	2.0	
S	67.8	72.6		6.6	4.0		7.4	4.2	
			67.0		3.9	4.6			

$b \times D = 22B \times 4E$        $0.04 = 8.1$        $0.5 \times Q_A = 8.8$

	x	P/D	y	x	H/D <sup>2</sup>	y	x	P <sub>A</sub>	y	x	Q <sub>A</sub>	y	x	M	y
L		33.4		0.4	0.1			-	-						
S	32.7	32.6		22.2	2.3		1.2	-	1.7						
			32.1		2.4	2.4									

1-D19  
2-D25  
5-D25

2CvII

	x P Y	x H Y	x Q Y
L	3.0	0.3 0.3	0.2 0
E	0.4 0.4	1.1 0.9	0.6 0.5
S	3.4 2.6	3.4 2.6	1.4 0.6

$b \times b = 2.0 \times 2.0$

	x P/b Y	x H/b <sup>2</sup> Y	x P <sub>1</sub> Y	x Q <sub>1</sub> Y	x H Y
L	3.0	1.7	0	-	-
S	4.4 2.3	4.5 2.3	1.9	3.4	1.2 0.10

2CvII

	x P Y	x H Y	x Q Y
L	9.0	0.3 0.3	0.2 0
E	1.7 1.5	2.5 2.5	1.1 1.1
S	10.7 7.3	10.1 7.5	2.9 1.1

$b \times b = 2.0 \times 2.0$

	x P/b Y	x H/b <sup>2</sup> Y	x P <sub>1</sub> Y	x Q <sub>1</sub> Y	x H Y
L	11.5	1.7	0	-	-
S	13.7 9.3	13.5 9.6	15.3	6.2	0.12 0.10

1CvI

	x P Y	x H Y	x Q Y
L	15.4	0.5 0.1	0 0.1
E	4.0 3.1	2.7 4.5	1.2 1.5
S	19.4 11.9	13.5 12.3	2.9 4.6

$b \times b = 2.0 \times 2.0$

	x P/b Y	x H Y	x P <sub>1</sub> Y	x Q <sub>1</sub> Y	x H Y
L	18.7	1.1	0	-	-
S	24.7 14.6	23.7 14.7	22.0	6.3	1.0 0.10

$2C_{D10}$	x P Y	x R Y	x Q Y
L	4A	0 0	0 0
E	0 0.5	1.1 0.15	0.1 0.3
S	4A 5.4 4A	1.3 0.6	1.4 0.6

$6 \times 10 \rightarrow 2 \times 10 \times 2 \times 10$

	x $P/10$ Y	x $R/10$ Y	x P Y	x At Y	x M Y
L	6.3	0 0	-	-	-
S	6.3 4A 5.6	1.3 3.4	0.1A 0.06	1.5 0.6	2.01A 2.01A

$2C_{D10}$	x P Y	x R Y	x Q Y
L	10.0	0 0	0 0
E	0 1.5	2.6 1.1	1.5 0.6
S	10.0 11.5 9.5	2.6 1.1	3.0 1.2

$6 \times 10 \rightarrow 2 \times 10 \times 2 \times 10$

	x $P/10$ Y	x $R/10$ Y	x P Y	x At Y	x M Y
L	12.0	0 0	-	-	-
S	12.0 14.0 10.9	1.1 3.2	0.41 0.06	3.2 0.6	2.01A 2.01A

$1C_{D10}$	x P Y	x R Y	x Q Y
L	15.6	0 0	0 0
E	0 3.1	4.0 1.5	2.3 0.7
S	15.6 18.0 16.5	4.0 1.5	4.6 1.4

$6 \times 10 \rightarrow 2 \times 10 \times 2 \times 10$

	x $P/10$ Y	x $R/10$ Y	x P Y	x At Y	x M Y
L	20.0	0 0	-	-	-
S	20.0 25.0 16.0	4.0 4.5	1.50 0.10	1.0 1.0	2.01A 2.01A

ICB1	x P y	x R y	x Q y
L	61	06 07	03 0
E	04 02	06 2.9	03 0.9
S	65 5.1 5.9	1.4 2.9	1.5 1.2

$b \times D = 23 \times 78$

	x $\frac{1}{10}$ y	x $\frac{1}{10^2}$ y	x $\frac{1}{2}$ y	x $a_1$ y	x $a_2$ y
L	7.8	3.9 0	0.5		
S	8.3 4.3 11.5	1.9 5.1	0.2 0.09	1.6 0.7	2.0 1.9

$2 \cdot 0.19$

ICA1	x P y	x R y	x Q y
L	7.1	01 0	01 0
E	10 26	16 7.0 8.9 10.3	0.7 3.3
S	8.1 6.1 10.7 3.5	2.0 10.3	1.4 6.6

$b \times D = 23 \times 175$

$2 \cdot 27 = 16.3$

	x $\frac{1}{10}$ y	x $\frac{1}{10^2}$ y	x $\frac{1}{2}$ y	x $a_1$ y	x $a_2$ y
L	7.4	0.2 -	-	-	-
S	7.4 2.9 5.1 1.7	4.3 6.6	0.7 0.24	2.7 5.0	2.0 1.9 2.0

ICA2	x P y	x R y	x Q y
L	13.0	0 0	4.3 0
E	0.3 0.6	1.6 3.0 2.1 0	0.7 0.7
S	13.7 13.7 12.4	2.0 8.0	1.4 2.2

$b \times D = 23 \times 175$

	x $\frac{1}{10}$ y	x $\frac{1}{10^2}$ y	x $\frac{1}{2}$ y	x $a_1$ y	x $a_2$ y
L	6.2	0 2.1	-	-	-
S	13.7 6.0 6.5 5.9	4.3 5.1	0.08 0.12	1.7 2.3	2.0 1.9

IC04	x P Y	x M Y	x Q Y
L	8.1	0 0	0 0
E	0 3.1	1.2 2.4 2.0 10.3	0.1 3.6
B	8.1 11.9 4.3	2.0 10.3	1.4 7.2

b x D = 7.6 x 7.5

	x P/10 Y	x M/10 <sup>3</sup> Y	x P <sub>A</sub> Y	x A <sub>1</sub> Y	x M Y
L	3.9	0 0	- -		
S	3.9 5.7 2.0	4.3 6.6	0.2 0.24	2.4 5.0	2.0 1.9 2.0 1.9

IC04	x P Y	x M Y	x Q Y
L	18.0	0.3 0.1 0.2 0	0.1 0
E	2.0 3.9	0.7 0.9 0.3 1.2	0.3 0.4
S	20.0 21.9 16.0 14.6	1.1 1.2	0.1 0.6

b x D = 2.8 x 7.6

	x P/10 Y	x M/10 <sup>3</sup> Y	x P <sub>A</sub> Y	x A <sub>1</sub> Y	x M Y
L	2.1	0.7 0.6	- -		
S	2.1 2.9 2.0 1.9	0.7 0.6	- -		2.0 1.9 2.0 1.9

IC06	x P Y	x M Y	x Q Y
L	17.8	2.1 0.2 1.6 0.1	0.9 0.1
E	2.0 3.9	0.7 1.9 1.6 2.3	0.3 0.6
S	19.8 21.2 15.8 14.4	1.2 2.9	0.3 1.7

b x D = 2.8 x 7.5

	x P/10 Y	x M/10 <sup>3</sup> Y	x P <sub>A</sub> Y	x A <sub>1</sub> Y	x M Y
L	0.5	2.0 0.4	- -		
S	0.5 1.0 0.5 1.9	0.6 5.1	0.2 0.1	4.2 2.1	2.0 1.9 2.0 1.9

CC1	x P Y	x R Y	x Q Y
L	20.6	0.2 0.1	2.0 0.1
E	1.5 0.8	1.4 1.9 2.3	4.0 0.8
S	22.1 21.4 19.1 19.6	10.1 14.8	2.4 10.0 1.7

$b \times D = 2.8 \times 0.5$

	x P/2 Y	x R Y	x P <sub>1</sub> Y	x Q <sub>1</sub> Y	x R <sub>1</sub> Y
L	9.6	0.3 0.4	0.5	-	-
S	10.5 10.2 9.1 9.4	10.3 9.1	0.2 0.05	5.9 1.1	2.022 2.019

CC2	x P Y	x R Y	x Q Y
L	35.3	0.8 0.4 0.2	0.2 0.1
E	1.0 0.2	2.8 2.3 4.0	1.2 1.4
S	36.3 35.5 34.3 34.1	3.0 4.2	2.6 2.9

$b \times D = 4.0 \times 4.0$        $0.4 \times 4 = 1.6$

	x P/2 Y	x R/2 Y	x P <sub>1</sub> Y	x Q <sub>1</sub> Y	x R <sub>1</sub> Y
L	22.1	1.3 0.5	-	-	-
S	23.1 22.2 21.5 21.9	1.3 2.0	-	-	2.019 2.019

CC3	x P Y	x R Y	x Q Y
L	19.2	0.4 0.2 0.1	0.1 0.1
E	2.5 0.8	1.1 1.3 1.7 2.3	4.3 0.8
S	21.7 20.0 18.7 18.4	12.5 2.4	0.7 1.7

$b \times D = 2.8 \times 1.5$

	x P/2 Y	x R/2 Y	x P <sub>1</sub> Y	x Q <sub>1</sub> Y	x R <sub>1</sub> Y
L	9.1	0.3 0.4	-	-	-
S	10.3 9.5 8.0 8.1	0.0 4.1	0.2 0.07	4.2 1.5	2.019 2.019

ICFA	x	P	Y	x	P	Y	x	P	Y
L		0.15		0.4	0.3		0.1	0.1	
E	0.9		0.6	1.6	0.2		0.7	0.8	
S	3.22		31.9	7.2	7.5		1.5	1.5	
	30.6		30.5						

40 6

$d = 40 \times 0.8 / 30 = 1.07$

L  $P/d = 0.726$   
 $30.6 / 30.5 = 0.011$   $\frac{1}{3}$   $P_A = 0$

S  $P/d = 0.010$   $0.009\%$   
 $3.22 / 30.5 = 0.0204$   $\frac{2}{3}$   $P_A = 0$

$0.726 = 10.0$

$n = 12 - 0.173$

TIE BEAM 35 x 90  $w = 0.176 \text{ in}$   
 FG 10 12  $l = 25.6$

$M_{OE} = 9.9 + 0.2 = 10.1$

$M_{OF} = 5.8 + 0 = 5.8$

$w' = 0.076 + 0.147 = 1.223 \quad L = 4.10$

$C = w'l^2/12 = 1.071$

$M_0 = " / 1.87 = 2.558$

$M_{IF} = 1.22C = 2.1$

$\Sigma M_{IF} = 5.8 + 2.1 = 7.9$

$M_L = 0.6 M_0 = 1.5$

$A_{OE} = 10.1 / 0.176 \times 3.0 = 4.6 \quad 2-19$

$A_{IF} = 7.9 / " = 3.6 \quad 2-19$

FG 10 13

$M_{OE} = 19.9 + 1.5 = 21.4$

$M_{OF} = 3.0 + 0.2 = 3.2$

$M_{IF} = 1.5 + 0 = 1.5$

$w' = 0.076 + 1.27 = 2.03 \quad L = 5.41$

$w' = 0.176 \quad L = 3.32$

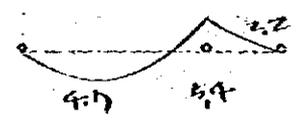
$C = 2.03 \times 5.41^2 / 12 = 4.95$

$0.176 \times 3.32^2 / 12 = 0.39$

$M_0 = " / 1.87 = 7.93$

$" / 1.87 = 0.21$

1.0 0.22  
 0.30 0.110  
 + 7.93 - 0.21  
 - 2.03 = 4.42



$\Sigma M_{IF} = 3.2 + 5.4 = 8.6$

$A_{OE} = 21.4 / 0.176 \times 3.0 = 9.6 \quad 4-19$

$A_{IF} = 8.6 / " = 3.9 \quad 2-19$

LAUNDRY

FG 35 x 75      W = 0.63      } = 59.5

ME = 0.9 + 0.3 = 1.2

W' = 0.63 + 1.03 = 1.66      l = 410

MB = 1.66 x 4.1<sup>2</sup> / 12 = 23.5

AE = 1.2 / 0.595 x 3.0 = 0.7      2-DIA

AC = 3.5 / 0.595 x 2.0 = 2.9      2-DIA

DINING

FG 35 x 90

ME = 11.9 + 3.9 = 15.8

MEE = 1.6 + 0.1 = 1.7

W' = 0.76      l = 696

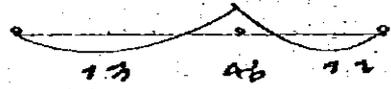
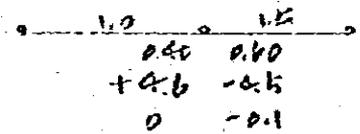
W = 1.076 + 0.60 = 1.66      l = 465

C = 0.18 x 6.96<sup>2</sup> / 12 = 3.06

1.66 x 4.65<sup>2</sup> / 12 = 2.93

MB =      "      l = 470

"      l = 465



MEE = 1.7 + 4.6

AOE = 15.8 / 0.726 x 2.0 = 6.9      2-DIA

MEE = 4.6 / 0.726 x 2.0 = 3.7      2-DIA

FOUNDATION

PILE 30g  $f_p = 25^T$

FOOTING  $0.9 \times 0.9 \times 0.15 \times 2.4 = 1.5$

$$f_p' = 25 - 1.5 = 23.5 \rightarrow 23$$

35g  $f_p = 30^T$

FOOTING  $1.05 \times 1.05 \times 0.15 \times 2.4 = 2.0$

$$f_p' = 30 - 2.0 = 28$$

40g  $f_p = 35^T$

FOOTING  $1.2 \times 1.2 \times 0.15 \times 2.4 = 2.6$

$$f_p' = 35 - 2.6 = 32.4 \rightarrow 32$$

FASTING

	P	WALL	TILE FRAM	ΣP	9 x 4	l x l'
B15	49.5	0.47 x 2.82 1.30 1.27 x 2.53 3.25	5.17	59.7	408 x 3	1.20 x 3.60
B16	22.2	0.47 x 1.91 0.90 1.27 x 1.71 1.54	2.36	27.2	408 x 1	1.20 x 1.20
B'16	27.2	0.67 x 1.21 0.81 1.27 x 2.11 2.95	3.62	35.3	408 x 2	1.20 x 2.40
C15	67.4	1.27 x 2.56 3.25 1.14 x 2.82 3.22	6.06	82.9	408 x 4	2.00 x 2.40
C16	33.7	0.47 x 2.82 1.30 1.27 x 4.3 5.05	2.54	44.1	408 x 2	1.20 x 2.40
D10	15.6	0.15 x 2.82 0.42	4.00	19.8	408 x 1	1.20 x 1.20
D15	18.0	0.15 x 1.91 0.28	4.00	22.3	"	"
D16	19.1	1.64 x 1.91 3.11	2.64	24.7	"	"
E15	61	1.08 x 3.06 3.29	3.60	17.8	309 x 1	0.90 x 0.90
H15	1.8	0.30 x 2.82 1.15	1.18	4.1	41/3 = 1.37	1.00 x 1.50
A1	7.1	1.13 x 1.82 1.15	1.76	10.0	309 x 1	0.90 x 0.90
A2	13.0	0.54 x 2.10 1.13 0.54 x 2.59 1.10	1.76	15.3	"	"
A4	8.1	1.13 x 1.02 1.15	2.64	13.0	"	"
B1	11.5	0.54 x 2.00 1.08 1.13 x 1.02 1.15	3.02	17.4	"	"
B4	13.0	0.91 x 5.9 5.37 0.91 x 1.8 1.63	4.76	20.2	309 x 2	1.90 x 1.90
B6	17.8	2.34	4.76	27.2	"	"
C1	20.6	2.65	5.66	29.9	"	"
C4	35.3	0.91 x 4.3 3.91	8.30	46.0	309 x 3	0.90 x 2.70
C6	19.2	1.13 x 2.02 1.15	4.76	26.1	209 x 2	0.90 x 1.80
D1	17.0	1.13 x 2.01 1.15	1.76	11.8	309 x 1	0.90 x 0.90
D6	10.3	1.13 x 1.22 1.15	1.76	13.2	"	"
E4	31.3		9.14	40.5	309 x 3	0.90 x 2.70

$$F_2 \quad 408 \times 2 \quad 120 \times 240 \quad D = 125 \quad f = 259.5$$

$$\sigma_p = 44.1 / 2 = 22.1 = \sigma$$

$$\tau_s = 22.1 \times 10^3 / 120 \times 259.5 = 7.1 < 5.0$$

$$q = 22.1 \times 10^3 / 259.5 \times 15 = 28.1$$

$$a = 22.1 \times 60 / 259.5 \times 2.0 = 11.1 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} b - \text{D16}$$

$$F_3 \quad 408 \times 3 \quad 120 \times 360$$

$$\sigma_p = 39.6 / 3 = 13.2$$

$$q = 13.2 \times 10^3 / 259.5 \times 15 = 22.3$$

$$a = 13.2 \times 120 / 259.5 \times 2.0 = 20.1 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} b - \text{D19}$$

$$F_4 \quad 408 \times 4 \quad 240 \times 240$$

$$\sigma_p = 37.2 / 4 = 9.3$$

$$q = 9.3 \times 10^3 / 259.5 \times 15 = 23.4$$

$$a = 9.3 \times 240 / 259.5 \times 2.0 = 20.9 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} b - \text{D19}$$

$$F_1 \quad 408 \times 1 \quad 120 \times 120$$

b - D16

$$F_5 \quad 308 \times 1 \quad 90 \times 90$$

a - D16

$$F_6 \quad 308 \times 2 \quad 90 \times 180 \quad D = 60 \quad f = 464$$

$$\sigma_p = 28.9 / 2 = 14.4$$

$$\tau_s = 14.4 \times 10^3 / 90 \times 464 = 3.4 < 5$$

$$q = 14.4 \times 10^3 / 464 \times 15 = 20.1$$

$$a = 14.4 \times 45 / 464 \times 2.0 = 20 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} a - \text{D16}$$

$$F_7 \quad 308 \times 3 \quad 90 \times 270$$

$$\sigma_p = 40.0 / 3 = 13.3$$

$$a = 13.3 \times 90 / 464 \times 2.0 = 12.5 \quad b - \text{D16}$$

SLAB

$w_k = 610$

$w_{k1} = 590$

S<sub>1</sub>  $l_x = 4.10$   $l_y = 4.1$   $\lambda = 1.32$

$M_{x1} = 0.067 \times w \times 4.10^2 = 1.06w$

0.65

0.67

$M_{x2} = 0.047 \times w \times 4.10^2 = 0.71w$

0.47

0.42

$M_{y1} = 0.047 \times w \times 4.10^2 = 0.71w$

0.47

0.42

$M_{y2} = 0.027 \times w \times 4.10^2 = 0.47w$

0.29

0.24

$d = 12$   $a = 9$   $j = 1.4$

$a_{x1} = 4.2$   $\varnothing 13 \varnothing 10 \varnothing 20 \text{ @}$

4.0

$\varnothing 13 \varnothing 10 \varnothing 20 \text{ @}$

$a_{x2} = 2.8$   $\varnothing 10 \varnothing 20 \text{ @}$

2.7

$\varnothing 10 \varnothing 20 \text{ @}$

$a_{y1} = 3.1$   $\varnothing 10 \varnothing 20 \text{ @}$

3.0

$\varnothing 10 \varnothing 20 \text{ @}$

$a_{y2} = 2.1$

2.0

S<sub>2</sub>  $l_x = 2.32$   $l_y = 4.10$   $\lambda = 1.77$

$w_k = 560$

$w_{k1} = 540$

$M_{x1} = 0.076 \times w \times 2.32^2 = 0.41w$

0.23

$M_{x2} = 0.051 \times w \times 2.32^2 = 0.27w$

0.15

$M_{y1} = 0.047 \times w \times 4.10^2 = 0.23w$

0.13

$M_{y2} = 0.027 \times w \times 4.10^2 = 0.15w$

0.08

$d = 10$   $l = 11$   $j = 1.1$   $5.2$

$a_{x1} = 1.9$   $\varnothing 10 \varnothing 20 \text{ @}$

$a_{x2} = 1.2$

$a_{y1} = 1.2$   $\varnothing 10 \varnothing 25 \text{ @}$

$a_{y2} = 0.8$

