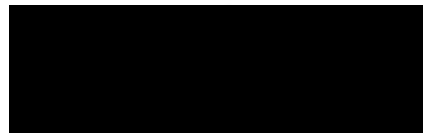


構造計算書

浦所署 附船出張所
改築工事



西浦町署附船出港所
改築構造計算書

1. 工事場所 新潟市附船出港所 15日 4400

2. 構造相模 鉄筋コンクリート造
地上 2階 車庫部平家
建築面積 135.59 m²
床面積 194.04 m²

3. 適用法令 建築基準法 新潟県条例
日本建築学会計算規程
其他法令

4. 使用材料
コンクリート $F_c = 210 \text{ kg/cm}^2$
鉄筋 JIS S539
SSD49

仕工概要

外部 地上 2階部分除地下長 軒高24.45m全高
' 全体 合型構2.7m間投 吹付タタ
建具 アルミサッシ
車庫 オートロック式ドア

17階 床 エルゴノミク座席 車庫コンクリート木造

天井 軒下地下地石音板 車庫 階高
" " 後服室 廊下
" 柱間 3000 車庫
軒下地大音板 住付 設備
" " 2階 階段

壁 石音板 12F 車庫 1階高
後服室

半磁器タタ 住付 設備室

エレベーター 2階 廊下

コンクリート打放 車庫

設計荷重

層托(一般) 2mm-1 120 255 kg/m²
 防水 50
 天井石膏ボード 14
 ≡ 380 kg/m²

層托(532) 2mm-1 120 255 kg/m²
 石膏ボード 15 30
 2mm-1 防水 14
 保冷2mm-1 90 40
 石膏ボード 80 144
 仕上石膏ボード 25 50
 天井石膏ボード 14
 ≡ 580 kg/m²

ビニール床 2mm-1 100 255
 防水 60
 グラス床 230
 天井石膏ボード 14
 ≡ 592 kg/m²

仮設床 2mm-1 120 255
 防水 60
 グラス床 120
 天井石膏ボード 14
 ≡ 452 kg/m²

階床 237 576 kg/m²
 防水 80
 天井 (12mm FRC) 39
 ≡ 693 kg/m²

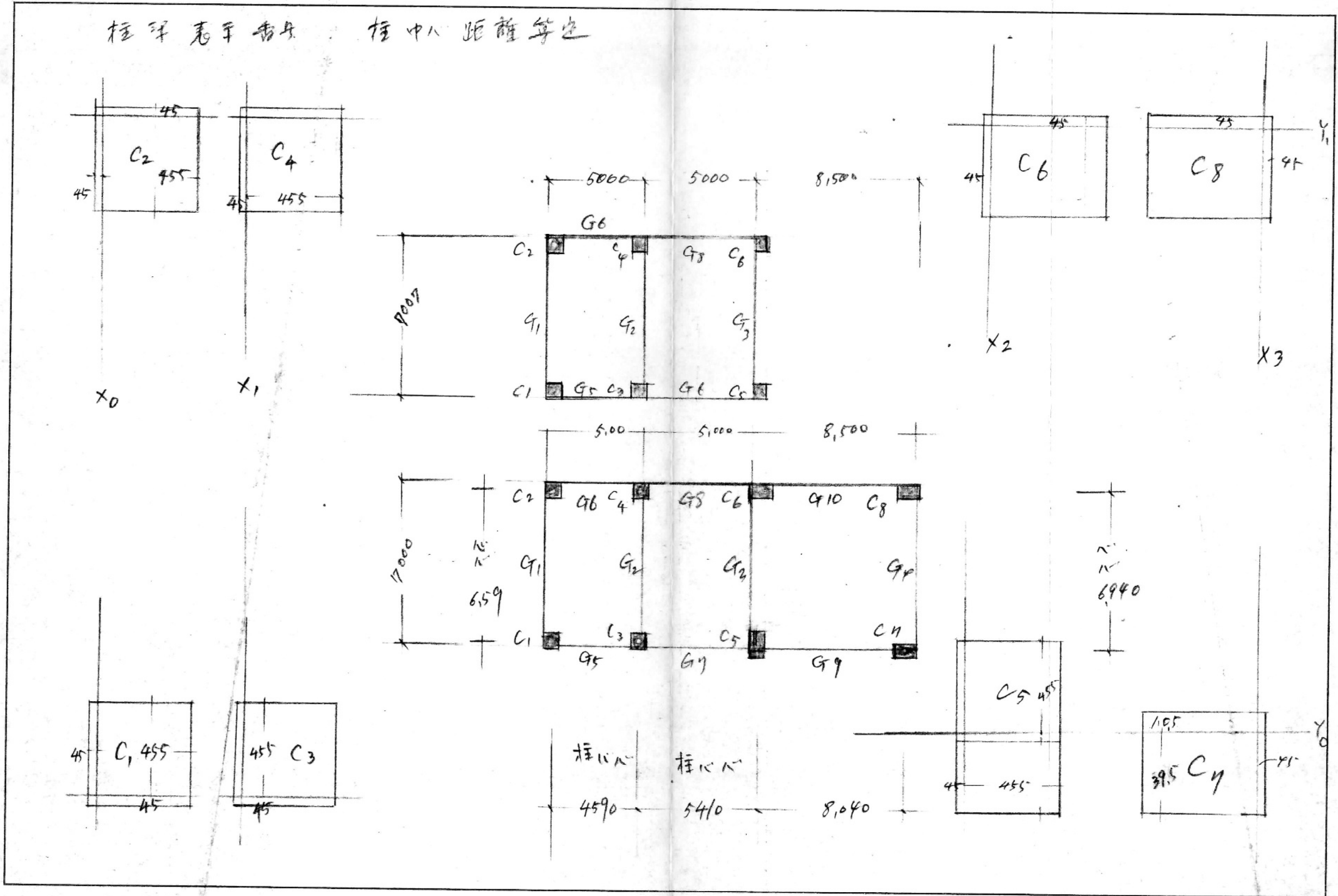
階 15cm 2mm-1 360
 防水 両面 80
 ≡ 440 kg/m²

1階 12cm 2mm-1 288
 防水 両面 50
 ≡ 338 kg/m²

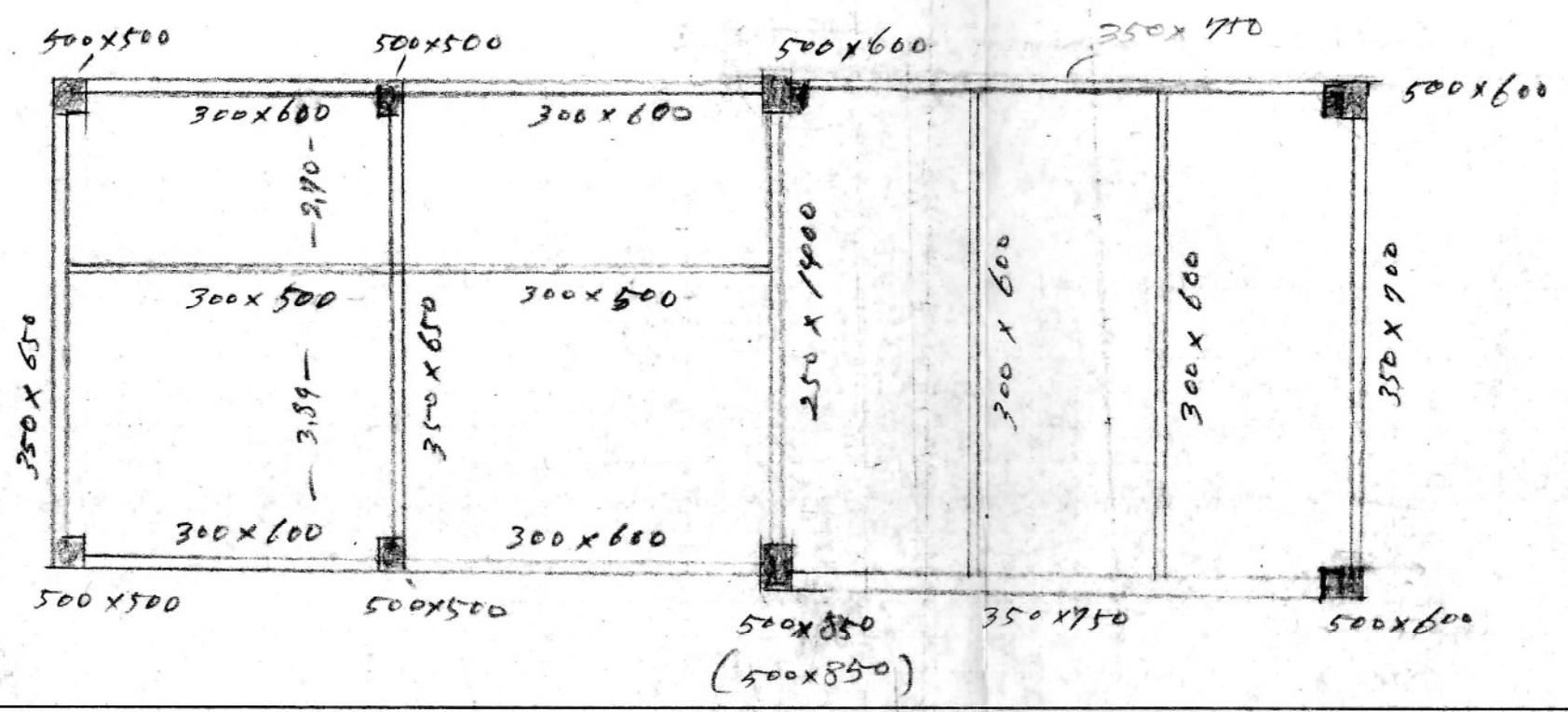
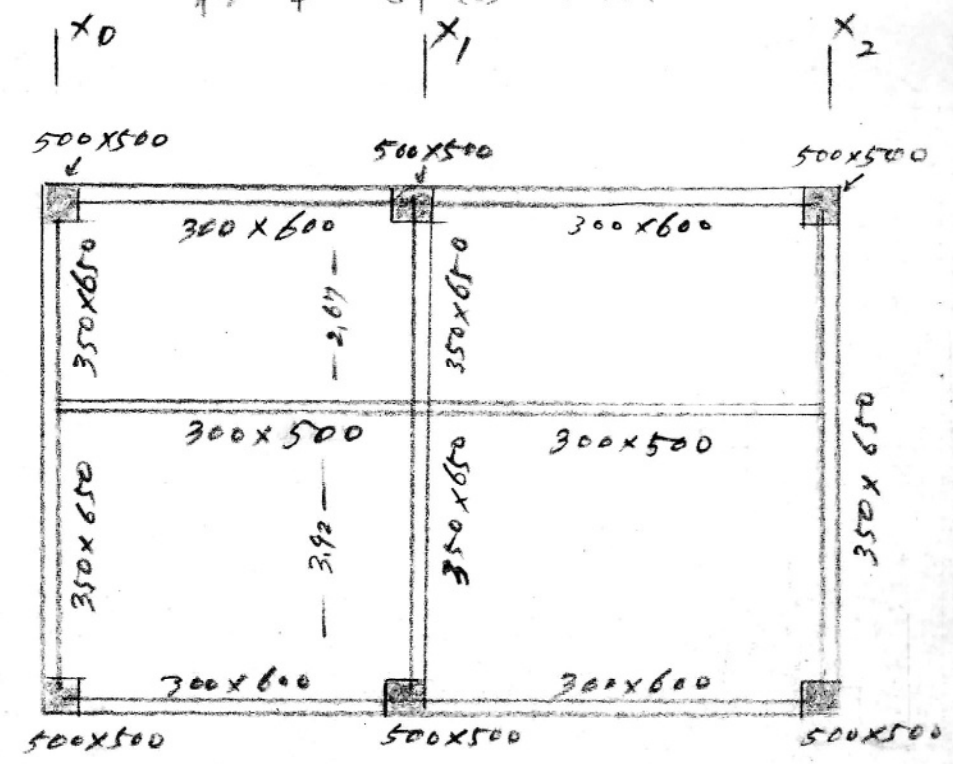
設計荷重

名称	固定積載 全		固定積載 全		固定積載 全				
	層托(一般)	層托(532)	ビニール床	仮設床	階床	階			
床237	382	310	592	482	180	662	402	550	952
3-12	352	150	532	482	130	612	402	400	802
地床	352	70	452	482	60	640	402	200	602
名称	ビニール床		仮設床		階床				
床237	592	300	892	482	180	662	402	300	993
3-12	592	150	792	482	130	612	402	180	593
地床	592	80	672	482	60	542	402	80	773

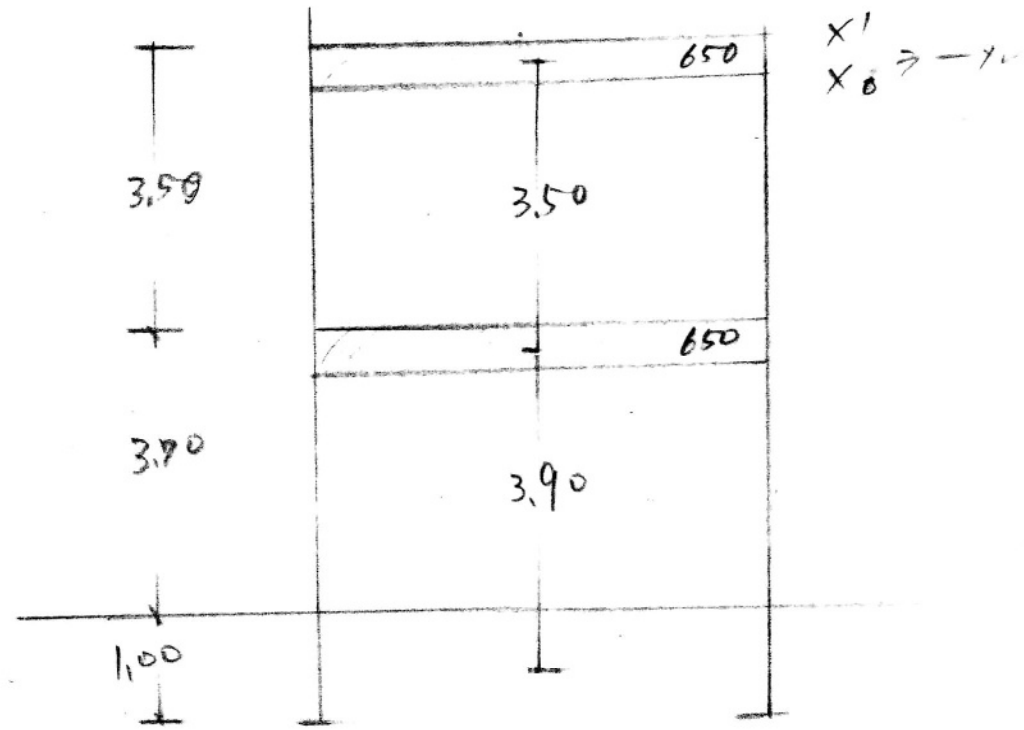
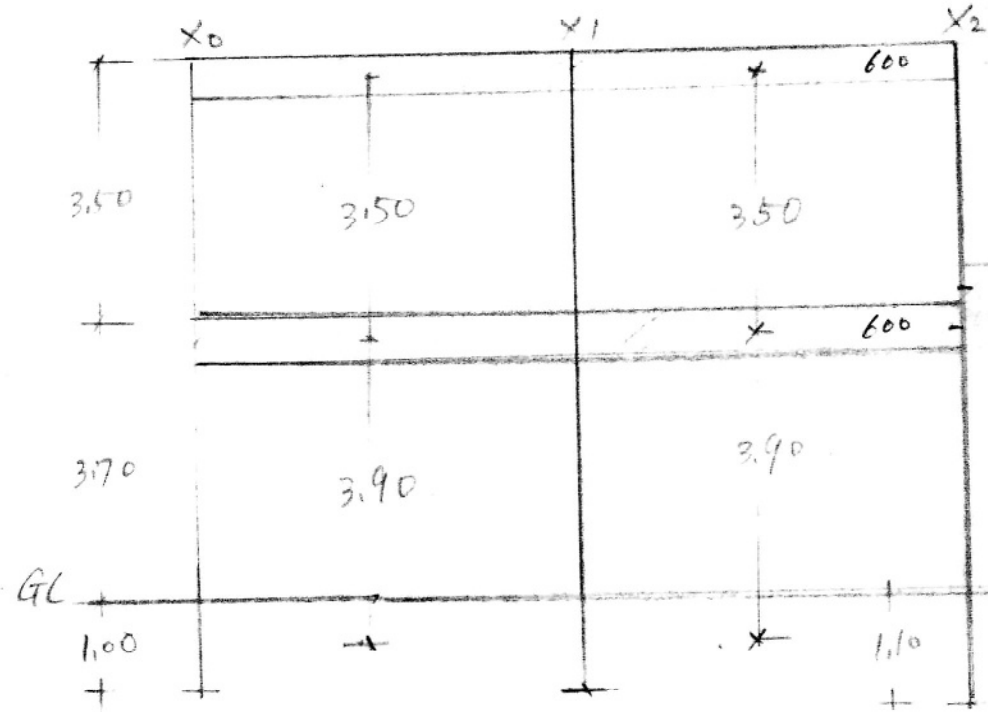
柱距表平剖：柱中心距離等定



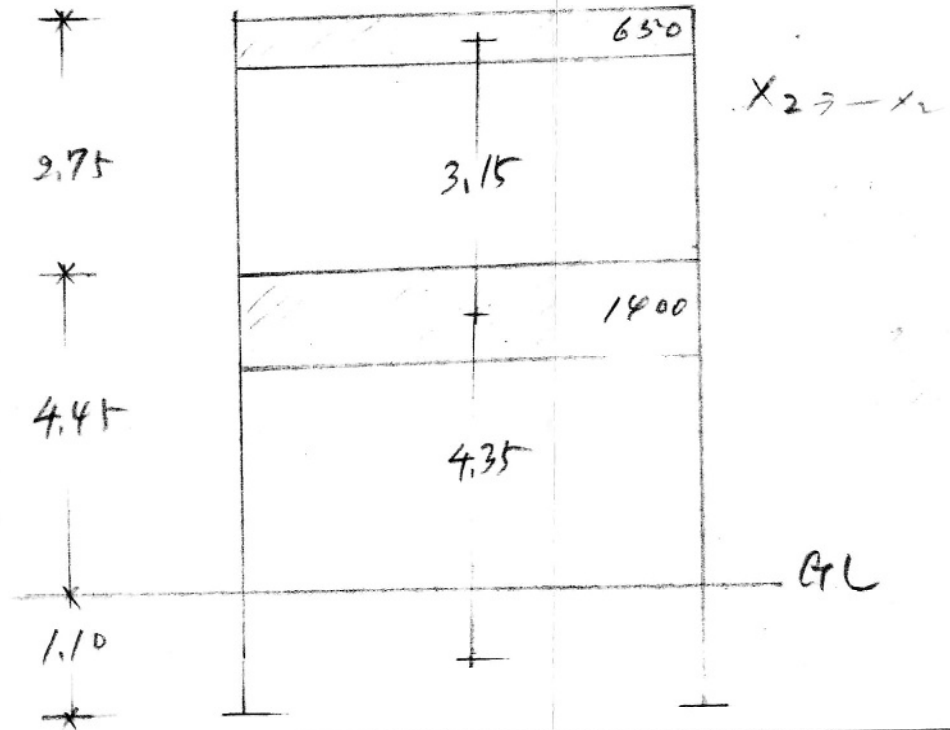
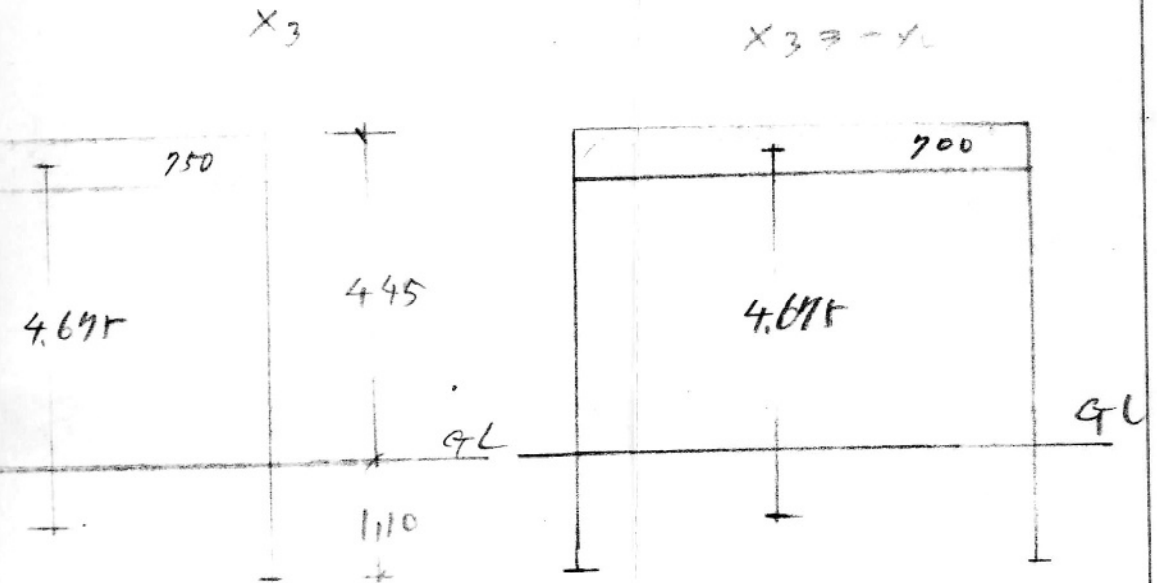
打平断面图法



槽道计算层高寸法



(208(7))



スラットの有効幅の算定 Y方向

	l	l'	b	b'	0.5l	a=l'- $\frac{b+b'}{2}$	λ	B	
								スラット幅	スラット間
R4, G3 2G1	659	459	35	35	329	424	65.9	100.9	
R0, G2 2G2	659	500	35	35	329	465	65.9		166.8
2G4	694	804	35	35	347	765	69.4	100.4	

剛性の算定

		b	D	B	t	B/b	t/b	ϕ	I ₀	I	l	K	l _e
R2	G1, G3	35	65	100.9	12	2.88	0.154	1.52	8.03	12.20	65.9	1.85	1.38
R2	G2	35	65	166.8	12	4.76	0.184	1.84	8.03	14.77	65.9	2.24	1.67
2	G3	25	140						48.83		6.94	7.03	5.24
2	G4	35	70	100.4	12	3.00	0.171	1.54	10.00	15.4	6.94	2.21	1.64
2	C1, C2 C3, C4	50	50						5.21		3.50	1.48	1.10
2	C5, C6	50	50						5.21		3.15	1.65	1.23
1	C1, C3 C1, C4	50	50						5.21		3.90	1.34	1.00
1	C5	50	85						25.58		4.35	5.88	4.38
1	C6	60	50						6.25		4.35	1.43	1.06
1	C7, C8	60	50						6.25		4.70	1.32	0.98
	F1	40	100						33.33		6.59	5.05	3.76
	F2	"	"						33.33		6.94	4.80	3.58
	F3	40	150						112.50		6.94	16.21	12.09

X方向

	l	l'	b	b'	0.5l	a=l'- $\frac{b+b'}{2}$	λ	B	
								スラット幅	スラット間
P4, G6 2G5, G6	459	659	30	30	229.5	629	45.9	75.9	
P4, G7 2G7, G7	541	659	30	30	270.5	629	54.1	84.1	
G9, G10	804	694	35	35	402	659	80.4	115.4	

X方向

		b	D	B	t	B/b	t/b	ϕ	I ₀	I	l	K	l _e
R2	G5, G6	30	60	75.9	12	2.53	0.120	1.46	5.40	7.88	45.9	1.71	1.28
R2	G7, G8	30	60	84.1	12	2.80	0.120	1.52	5.40	8.20	5.41	1.51	1.13
2	G9, G10	35	71	115.4	12	3.31	0.116	1.58	12.30	19.4	8.04	2.41	1.81
2	C1, C2 C3, C4	50	50						5.21		3.50	1.48	1.11
2	C5, C6	50	50						5.21		2.82	1.84	1.38
1	C7, C8	50	60						9.00		4.70	1.91	1.43
1	C6	50	60						9.00		4.00	2.25	1.69
1	C5	85	50						8.85		4.00	2.21	1.66
1	C1, C3 C3, C4	50	50						5.21		3.90	1.33	1.00
2	C5	85	50						8.85		0.67	13.11	9.85
2	C6	50	60						9.00		0.67	13.33	10.02
	F5, 6	40	100						33.33		4.59	7.26	5.45
	F7, 8	40	100						33.33		5.41	6.16	4.63
	F9, 10	40	100						33.33		8.04	4.14	3.11

剛域の算定

	階	名称	D	D'	$\frac{D'}{2} - \frac{D}{4}$	l	λ
梁 方向	R	G1, G2, G3	65	50	8.125	6.59	0.0132
	2	G1, G2	65	50	5.125	6.59	0.0132
	2	G3	140	70	0	6.98	0
	2	G3	140	50	0	6.98	0
	2	G4	70	50	4.50	6.98	0.0107
梁 方向	R	G5, G6	60	50	10.00	4.59	0.0217
	R	G7, G8	60	50	10.00	5.41	0.0184
	2	G5, G6	60	50	10.00	4.59	0.0217
	2	G7	60	50	10.00	5.41	0.0184
	2	G8	60	60	15.00	5.41	0.0217
	2	G9, G10	75	60	11.25	8.09	0.0139
	2	G9	75	50	6.25	8.09	0.0097
柱 方向	2	C1, C2, C3, C4, C5, C6	50	65	20.00	3.50	0.0541
	2	C5	50	65	20.00	3.15	0.0630
	2	C6	50	140	57.50	3.15	0.1520
	1	C1, C2, C3, C4, C6	50	65	20.00	3.90	0.0512
	1	C6	50	140	57.50	4.35	0.1320
	1	C5	70	140	52.50	4.35	0.1200
	1	C7, C8	50	70	22.50	4.70	0.0440
	1	C1, C2, C3, C4	50	100	37.50	3.90	0.0960
	1	C7, C8	50	100	37.50	4.70	0.0740
	1	C5	70	100	32.50	4.35	0.0740
	1	C6	50	100	37.50	4.35	0.0580
柱 方向	2	C1, C2, C3, C4	50	60	17.50	3.50	0.0500
	2	C5	50	60	17.50	0.675	0.2590
	2	C5	50	60	17.50	2.825	0.0610
	2	C6	60	60	15.00	0.675	0.2220
	2	C5	50	75	25.00	0.675	0.3700
	2	C6	60	75	22.50	0.675	0.3330
	1	C2, C3, C4, C5, C6	50	60	17.50	3.90	0.0440
	1	C7, C8	60	75	22.50	4.70	0.0440
	1	C1, C2, C3, C4, C5	50	100	37.50	3.90	0.0960
	1	C5, C7, C8	60	100	35.00	4.70	0.0740
	1	C6	60	100	35.00	3.90	0.0897
2	C5	50	75	25.00	2.825	0.0884	
1	C6	60	60	15.00	3.90	0.0384	

剛性係数の算定

階	名称	λ_A	λ_D	D	l	l1	柱と梁の係数					k ₁	k ₂
							a	a'	b	c	c'		
梁 方向	R G1, 2G1	0.0132	0.0132	65	6.59	641	2.00	2.00	1.00	1.00	1.00	1.38	1.38
	R G2, 2G2	"	"	"	"	"	"	"	"	"	1.67	1.67	
	2 G3	0	0	140	6.98	698	1.80	1.80	0.87	0.87	5.24	4.55	
	2 G4	0.0107	0.0107	70	6.98	698	2.00	2.00	1.00	1.00	1.10	1.64	1.64
梁 方向	R G5, 2G5	0.0217	0.0217	60	4.59	459	2.00	2.00	1.00	1.00	1.00	1.28	1.28
	R G7, R G8, 2G8	0.0184	0.0184	60	5.41	541	2.00	2.00	1.00	1.00	1.10	1.13	1.13
	2 G8	0.0184	0.0277	60	5.41	541	2.10	2.05	1.00	1.03	1.01	1.13	1.15
	2 G9	0.0077	0.0177	75	5.09	791	2.00	2.00	1.00	1.00	1.00	1.81	1.81
2 G10	0.0139	0.0139	75	8.09	786	2.00	2.00	1.00	1.00	1.00	1.81	1.81	
柱 方向	2 C1, C2, C3, C4	0.0541	0.0571	50	3.50	308	2.40	2.40	1.30	1.23	1.23	1.10	1.36
	1 C1, C2, C3, C4	0.0512	0.0790	50	3.90	339	2.70	2.40	1.40	1.36	1.26	1.00	1.31
	2 C5	0.0630	0.1820	50	3.15	237	3.20	2.70	1.60	1.61	1.43	1.23	1.85
	1 C5	0.120	0.074	70	4.35	350	3.30	2.60	1.70	1.66	1.43	4.38	6.26
	1 C6	0.1320	0.086	50	4.35	340	3.50	2.80	1.90	1.80	1.56	1.06	1.65
	1 C7, C8	0.074	0.047	50	4.70	410	2.70	2.40	1.40	1.36	1.26	0.98	1.23
	2 C1, C2, C3, C4	0.050	0.050	50	3.50	315	2.40	2.40	1.30	1.23	1.23	1.11	1.36
	2 C5, C6	0.061	0.0884	50	2.825	240	2.80	2.40	1.40	1.40	1.16	1.38	1.60
	2 C5	0.370	0.2590	50	0.675	0.25	3.50	2.30	0.60	4.36	0.96	9.85	9.45
	2 C6	0.222	0.333	60	0.675	0.30	2.40	1.70	0	0.80	0.56	10.2	5.61
	1 C5	0.044	0.096	50	3.90	335	2.80	2.40	1.45	1.41	1.28	1.66	2.12
1 C6	0.0384	0.0884	60	3.90	340	2.60	2.35	1.35	1.31	1.23	1.69	2.07	
1 C7, C8	0.044	0.044	60	4.70	413	2.50	2.30	1.30	1.26	1.20	1.43	1.71	

開比表 () ke

X ₀₃ -1		X ₁₃ -1	
1.11 (1.36)	1.38 (1.38)	1.11 (1.36)	1.67 (1.67)
1.00 (1.31)	1.38 (1.38)	1.00 (1.31)	1.67 (1.67)

X ₂₃ -1		X ₃₃ -1	
1.23 (1.85)	1.38 (1.38)	1.23 (1.85)	1.64 (1.64)
4.38 (6.26)	5.24 (7.55)	1.06 (1.65)	0.98 (1.23)

Y ₀₃ -1		Y ₁₃ -1	
1.11 (1.36)	1.28 (1.28)	1.11 (1.36)	1.38 (1.60)
1.00 (1.33)	1.28 (1.28)	1.00 (1.33)	1.81 (1.81)
			9.85 (9.45)
			1.66 (2.12)
			1.43 (1.71)

Y ₂₃ -1		Y ₃₃ -1	
1.11 (1.36)	1.28 (1.28)	1.11 (1.36)	1.38 (1.60)
1.00 (1.33)	1.28 (1.28)	1.00 (1.33)	1.81 (1.81)
			70.02 (561)
			1.69 (2.07)
			1.43 (1.71)

C M Q の算定

又計算

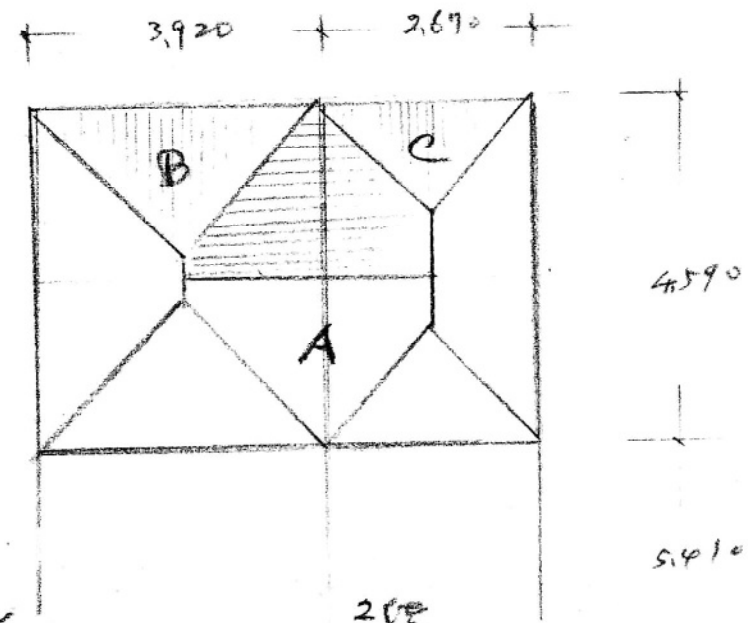
		l_x	l_y	λ	$\frac{c}{w}$	$\frac{m}{w}$	$\frac{Q}{w}$	w	c	m	Q
$Y_0 R$	—	4.59			1.75	2.63	2.30	0.114	0.199	0.299	0.262
R	—	4.59			1.75	2.63	2.30	0.345	0.603	0.907	0.793
(x_0-x_1)	Δ	3.92	4.59	1.17	2.40	3.80	2.60	0.532	1.276	2.021	1.383
								Σ	2.078	3.227	2.435
$Y_0 2$	—	4.59			1.75	2.63	2.30	0.345	0.603	0.907	0.793
(x_0-x_1)	Δ	3.59	4.59	1.17	2.40	3.80	2.60	0.772	1.552	2.337	2.007
								Σ	2.455	3.540	2.500
$Y_0 R$	—	5.41			2.43	3.65	2.70	0.114	0.249	0.416	0.307
R	—	5.41			2.43	3.65	2.70	0.345	0.607	0.907	0.793
(x_1-x_2)	Δ	3.92	5.41	1.38	3.70	6.00	3.30	0.532	1.968	3.192	1.755
								Σ	2.548	4.515	2.555
$Y_0 2$	—	5.41			2.43	3.65	2.70	0.345	0.777	0.416	0.307
(x_1-x_2)	Δ	3.89	5.41	1.39	3.70	6.00	3.30	0.612	2.264	3.672	2.019
								Σ	2.541	4.058	2.326
$Y_1 R$	—	4.59			1.75	2.63	2.30	0.459	0.802	1.206	1.055
(x_0-x_1)	Δ	2.67	4.59	1.71	2.05	3.10	2.20	0.532	1.090	1.649	1.190
								Σ	1.592	2.855	2.205
$Y_1 2$	—	4.59			1.75	2.63	2.30	0.345	0.603	0.907	0.793
(x_0-x_1)	Δ	2.70	4.59	1.70	2.10	3.20	2.20	0.710	1.491	2.272	1.562
								Σ	2.917	3.149	2.755

		l_x	λ	$\frac{c}{w}$	$\frac{m}{w}$	$\frac{Q}{w}$	w	c	m	Q	
$Y_1 R$	—	5.41			2.43	3.65	2.70	0.459	0.802	1.206	1.055
R	Δ	2.67	5.41	2.02	3.60	4.50	2.60	0.532	1.915	2.394	1.383
(x_1-x_2)								Σ	2.917	3.60	2.628
$Y_1 2$	—	5.41			2.43	3.65	2.70	0.345	0.603	0.907	0.793
(x_1-x_2)								Σ	0.603	0.907	0.793
$Y_1 Y_1$	—	7.99			5.32	7.90	3.99	0.529	2.514	4.179	2.110
R	—	7.99			5.32	7.90	3.99	0.607	0.907	0.793	
(x_2-x_3)	Δ	6.98	7.99	1.14	0.88	1.37	0.50	2.394	2.106	3.184	1.197
								Σ	9.259	17.958	9.607
Y_3	—	6.98			4.06	6.09	3.49	0.114	0.462	0.694	0.397
R	—	6.98			"	"	"	0.459	1.997	2.961	1.700
(x_2-x_3)	Δ	2.66	6.98	2.62	3.90	7.50	3.90	0.532	2.074	3.990	2.074
								Σ	4.513	7.689	4.171

C M Q a 等色 y 等

		h_2	h_1	λ	$\frac{c}{w}$	$\frac{m}{w}$	$\frac{a}{w}$	w	c	m	a
GX ₀ R	-	6.59	-	-	3.62	5.42	3.30	0.114	0.412	0.611	0.376
					3.62	5.42	3.30	0.445	1.611	2.411	1.468
					(0.944)	1.58	0.405	0.628	0.592	0.254	
					(0.643)	0.594	0.403	0.992	0.373		
					"	"	"	0.532	1.271	0.545	
			X2.532	0.866	2.128	0.808					
			=1.347								
			計 算 5.111	1.630	3.806	1.62					
				2.174		1.36					
			Σ	5.516	9.954	4.26	Y_0				
				5.466		4.38	Y_1				
GX ₀ R	-	6.59	-	-	3.62	5.42	3.30	0.445	1.611	2.411	1.468
					(0.944)	1.58	0.409	0.628	0.590	0.256	
					(0.652)	0.590	0.409	0.995	0.370		
					"	"	"	0.741	1.463	0.757	
					"	"	"	X2.532	1.223	2.982	1.106
			=1.576	2.271	5.361	2.31					
				3.058		1.58					
			Σ	6.234	11.752	4.80	Y_0				
				6.331		4.52	Y_1				
GX ₁ R	-	6.59	-	-	3.62	5.42	3.30	0.445	1.611	2.411	1.468
					(0.944)	1.58	0.405	1.769	1.292	2.163	0.554
					(0.643)	0.594	0.580	0.813			
					4.488	4.327	7.244	1.856			
						2.948		2.731			
			(3.260)	7.612	3.29						
			(4.345)		2.72						
			Σ	10.490	19.430	7.12	Y_0				
				9.787		7.93	Y_1				

		h_2	h_1	λ	$\frac{c}{w}$	$\frac{m}{w}$	$\frac{a}{w}$	w	c	m	a
GX ₁ R	-	6.59	-	-	3.62	5.42	3.30	0.445	1.611	2.411	1.468
					(0.944)	1.58	0.409	1.369	1.292	2.163	0.554
					(0.652)	0.594	0.590	0.580			
					5.601	5.264	8.904	2.271			
						3.651		3.318			
			(4.168)		4.16						
			5.554	9.706	3.44						
			Σ	12.335	23.184	5.45	Y_0				
				11.696		9.04	Y_1				
GX ₂ R	-	6.59	-	-	3.62	5.42	3.30	0.114	0.412	0.611	0.376
					3.62	"	"	0.445	1.611	2.411	1.468
					(0.944)	1.58	0.405	0.741	0.699	1.170	0.300
					(0.603)	0.594	0.496	0.496			
					6.088	3.056	5.116	1.311			
	X0.532	2.082	1.923								
	=3.238										
			計 算 5.111	1.630	3.806	1.62					
				2.174		1.36					
			Σ	7.408	13.120	5.07	Y_0				
				6.755		5.57	Y_1				
GX ₂ R	-	6.98	-	-	4.06	6.09	3.49	0.768	3.115	4.677	2.680
					(0.944)	1.58	0.405	0.741	0.699	1.170	0.300
					(0.652)	0.594	0.496	0.496			
					6.088	3.501	5.922	1.508			
					X0.612	2.428	2.212				
	=3.725										
			(1.897)	4.345	1.55						
			(2.466)		1.56						
			Σ	9.215	16.114	6.34	Y_0				
				3.888		6.55	Y_1				

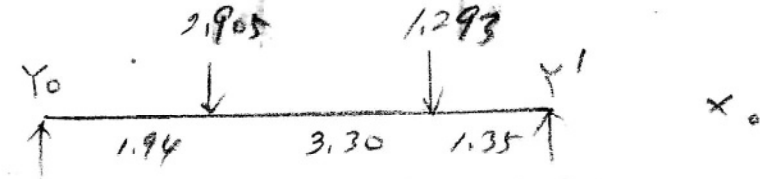


$A = 2.532 \text{ m}^2$
 $B = 3.541 \text{ m}^2$
 $C = 1.765 \text{ m}^2$

R_{Pc}
 $M_c = \frac{ab^2}{l^2} = 2.04 \frac{1.96 \times 4.63^2}{6.592} + 0.94 \frac{5.26 \times 1.33^2}{6.592} = 2.177 \text{ tm}$
 $M_o = \frac{ab}{l} = 2.04 \frac{1.96 \times 4.63}{6.59} + 0.94 \frac{5.26 \times 1.33}{6.59} = 3.806 \text{ tm}$
 $M_e = \frac{a^2b}{l} = 2.04 \frac{1.96^2 \times 4.63}{6.592} + 0.94 \frac{5.26^2 \times 1.33}{6.592} = 1.630 \text{ tm}$

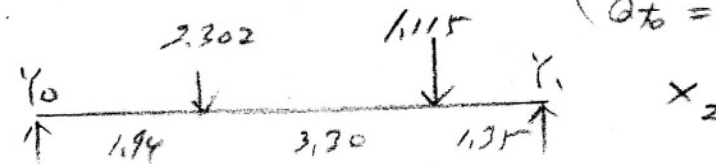
$\left(\begin{matrix} Q_{\frac{L}{2}} = 1.62 \text{ t} \\ Q_{\frac{L}{6}} = 1.36 \text{ t} \end{matrix} \right.$

2^o R_{Pc}



$M_c = 2.905 \times \frac{1.94 \times 4.65^2}{6.592} + 1.293 \times \frac{5.24 \times 1.35^2}{6.592} = 3.058$
 $M_o = 2.905 \times \frac{1.94 \times 4.65}{6.59} + 1.293 \times \frac{5.24 \times 1.35}{6.59} = 5.361$
 $M_e = 2.905 \times \frac{1.94^2 \times 4.65}{6.59} + 1.293 \times \frac{5.24^2 \times 1.35}{6.59} = 2.271$

$\left(\begin{matrix} Q_{\frac{L}{2}} = 2.31 \\ Q_{\frac{L}{6}} = 1.88 \end{matrix} \right.$



$M_c = 2.302 \times \frac{1.94 \times 4.65^2}{6.592} + 1.115 \times \frac{5.24 \times 1.35^2}{6.592} = 2.466$

$M_o = 2.302 \times \frac{1.94 \times 4.65}{6.59} + 1.115 \times \frac{5.24 \times 1.35}{6.59} = 4.345$

$M_e = 2.302 \times \frac{1.94^2 \times 4.65}{6.592} + 1.115 \times \frac{5.24^2 \times 1.35}{6.592} = 1.597$

$\left(\begin{matrix} Q_{\frac{L}{2}} = 1.55 \\ Q_{\frac{L}{6}} = 1.56 \end{matrix} \right.$

X₀ - X₁

X₁ - X₂

X₀

1.11	x	1.28	1.38	1.11	x
		-5.46	+5.57		
+2.43		+3.02	-3.05	-2.45	
+1.00		-1.52	+1.51	-1.00	
+0.24		+0.28	+0.28	-0.23	
Σ+3.67		-3.68	+3.69	-3.68	
1.00	1.11	1.28	1.38	1.00	1.11
		-6.33	+6.33		
+1.81	+2.01	+2.50	-2.50	-1.81	-2.01
0	+1.21	-1.25	+1.25	0	-1.22
+0.01	+0.01	+0.01	-0.01	-0.01	-0.01
Σ+1.82	+3.23	-5.07	+4.99	-1.82	-3.24

1.11	x	1.67	1.67	1.11	x
		-9.78	+10.49		
+3.90		+5.88	-6.31	-4.15	
+1.71		-3.15	+2.94	-1.81	
+0.57		+0.87	-0.68	-0.45	
Σ+6.15		-6.18	+6.44	-6.44	
1.00	1.11	1.67	1.67	1.00	1.11
		-11.69	+12.33		
+3.09	+3.43	+5.17	-5.45	-3.26	-3.62
0	+1.95	-2.72	+2.58	0	-2.09
+0.20	+0.22	+0.24	-0.21	-0.12	-0.14
Σ+3.29	+5.60	-8.90	+9.25	-3.33	-5.85

1.11	x	1.28	1.28	1.11	x
		-2.07	+2.07		
+0.96		+1.10	+0.28	+0.24	
+0.40		+0.14	+0.55	+0.01	
+0.25		-0.29	+0.02	+0.02	
Σ+1.11		-1.12	+2.92	+0.27	
1.13	1.13	1.38	x		
		-2.54	+2.54		
+0.24	-1.28	-1.56		Σ -1.40	
-0.64	+0.12	+0.48			
+0.02	-0.27	-0.32			
-3.22	+1.41	9.85	1.38	1.81	1.81
			-9.26	+9.26	
		16.99	+0.97	+1.28	-5.18
		-0.98	-0.75	-2.59	+0.84
		+3.28	+0.46	+0.60	-0.35
		Σ+9.29	+0.65	-9.97	+4.37
					-4.36
1.00	1.11	1.28	1.28	1.00	1.11
		-2.45	+2.45		
+0.72	+0.80	+0.92	+0.02	+0.01	+0.02
0	+0.48	+0.01	+0.46	0	+0.12
-0.14	+0.16	+0.18	+0.05	-0.04	-0.05
Σ 0.58	+1.44	-1.34	+2.98	-0.03	+0.09
			-2.70	+2.02	-0.78
					+1.19

1.38	1.51	1.81	1.43	x
		-9.26	+9.26	
+0.97	+1.28	-5.18	-4.07	
-0.75	-2.59	+0.84	0	
+0.46	+0.60	-0.35	-0.29	
Σ+9.29	+0.65	-9.97	+4.37	-4.36

Y₁

1.11	x	1.28	1.28	1.11	x
		-1.89	+1.89		
+0.57		+1.02	+0.31	+0.25	
+0.21		+0.15	+0.51	-0.28	
-0.16		-0.19	+0.16	+0.13	
Σ+0.92		-0.91	+2.87	+0.10	
1.13	1.13	1.38	x		
		-2.71	+2.71		
+0.26	-1.36	-1.35		Σ	
-0.68	+0.13	+0.48		-1.20	
+0.14	-0.28	-0.38			
-2.99	+1.20	7.02	1.38	1.82	1.82
			-9.26	+9.26	
		+7.01	+0.96	+1.27	-5.18
		-0.23	-0.67	-2.59	+0.84
		+1.82	+0.25	+0.48	-0.35
		Σ+8.60	+0.54	-10.10	+4.36
					-4.35
1.00	1.11	1.28	1.28	1.00	1.11
		-2.91	+2.91		
+0.85	+0.43	+1.11	-0.65	-0.57	-0.57
0	+0.43	-0.32	+0.55	0	+0.12
-0.03	-0.03	-0.04	-0.18	-0.14	-0.15
Σ+0.82	+0.83	-2.16	+2.63	-0.65	-0.60
				-1.35	-0.02
					-0.49
					+0.53

1.23	x	1.38	1.38	1.23	x
		-6.75	+7.40		
+3.19		+3.56	-3.91	-3.49	
+0.50		-1.95	+1.75	-0.70	
+0.68		+0.76	-0.57	-0.50	
Σ 7.37		-4.38	+4.70	-4.69	
4.38	1.23	5.24	5.24	1.06	1.23
		-5.88	+8.21		
+3.58	+1.00	+4.28	-6.03	+1.22	-1.41
0	+1.59	-3.01	+2.14	0	-1.74
+0.57	+0.76	+0.68	-0.27	-0.05	-0.06
Σ 4.15	+2.75	-6.93	+5.06	-1.27	-3.21

1.64	1.64	0.98	x
		-4.51	+4.51
		-2.32	-1.69
		+1.41	0
		-0.88	-0.53
Σ	+2.22	-2.22	

軸方向力算出

1) 各部自重

柱	0.5 × 0.5 × 2.4 2本	= 600
	2m × 40	= 80
		<hr/> 650 kg/m
柱	0.5 × 0.55 × 2.6	= 920
	2.7 × 40	= 108
		<hr/> 1028 kg/m
柱	0.5 × 0.6 × 2.4	= 720
	2.2 × 40	= 88
		<hr/> 808 kg/m
梁	30 × 60	= 345 kg/m
	0.3 × 0.45 × 2.6	=
	0.3 × 0.6 × 2.4	=
梁	35 × 65	= 445 kg/m
	0.35 × 0.53 × 2.4	=
梁	25 × 140	= 418 kg/m
	0.25 × 1.25 × 2.4	=
梁	35 × 45	= 529 "
	0.35 × 0.63 × 2.4	=
梁	35 × 40	= 487 "
	0.35 × 0.58 × 2.4	=
1階	30 × 50	= 274 "
	0.30 × 0.35 × 2.4	=
1階	0.125 × 0.04 × 2.4	= 90 "
	2.4 × 2.4 × 60	= 34
		<hr/> 114 kg/m

2) Y₀X₀柱(C₁) 2階

1階	0.114 × 5.59	= 0.637 t
スラブ	0.532 × 2.3 × 3.5	= 4.252 "
梁	0.345 × 2.05	= 0.707 "
梁	0.445 × 3.01	= 1.357 "
1階	0.244 × 2.2 / 2	= 0.301 "
柱	0.650 × 3.50	= 2.380 "
		<hr/> Σ = 9.664 t

1階

スラブ	0.742 × 2.3 × 3.5	= 6.214 t
梁	0.345 × 2.05	= 0.707 "
梁	0.445 × 3.05	= 1.357 "
1階	0.244 × 2.2 / 2	= 0.301 "
柱	0.650 × 3.170	= 2.516 "

Σ = 11.095 t

ΣΣ = 20.759 t

3) Y₁X₀柱(C₂) 2階

1階	0.114 × 5.59	= 0.637
スラブ	0.532 × 2.3 × 3.5	= 4.252
梁	0.345 × 2.05	= 0.707
梁	0.445 × 3.05	= 1.357
1階	0.244 × 2.2 / 2	= 0.301
柱	0.650 × 3.50	= 2.380

Σ = 9.664 t

1階

スラット	0.710 × 2.3 × 3.5	= 5.715
梁	0.345 × 2.05	= 0.707
梁	0.445 × 3.05	= 1.357
トラス	0.244 × 2.2/2	= 0.301
柱	0.680 × 3.70	= 2.516
		<hr/>
		Σ 10.596 t
		<hr/>
		ΣΣ 20,260 t

4) Y₀X₁ 柱 (C₃) 2階

103100t	0.114 × 5	= 0.570
スラット	0.532 × 5 × 3.5	= 9.310
梁	0.345 × 4.45	= 1.535
梁	0.445 × 3.05	= 1.357
トラス	0.244 × 4.65/2	= 0.637
柱	0.680 × 3.5	= 2.350
		<hr/>
		Σ 15.689

1階

スラット	0.710 × 2.3 × 3.5	= 5.715
トラス	0.612 × 2.71 × 3.5	= 5.504
梁	0.345 × 4.45	= 1.535
梁	0.445 × 3.05	= 1.357
トラス	0.244 × 4.65/2	= 0.637
柱	0.680 × 3.70	= 2.516
		<hr/>
		Σ 17.564
		<hr/>
		ΣΣ 33,253

5) Y₁X₁ 柱 (C₄) 2階

103100t	0.114 × 5	= 0.570
スラット	0.532 × 2.705 × 3.5	= 5.036
梁	0.345 × 4.45	= 1.535
梁	0.445 × 3.05	= 1.357
トラス	0.244 × 4.65/2	= 0.637
柱	0.680 × 3.5	= 2.350
		<hr/>
		Σ 11.515 t

1階

スラット	0.710 × 2.3 × 3.5	= 5.715
トラス	0.612 × 2.71 × 3.5	= 5.985
梁	0.573 × 1.5 × 2.40	= 3.535
梁	0.345 × 4.45	= 1.535
梁	0.445 × 3.05	= 1.357
トラス	0.244 × 4.65/2	= 0.637
柱	0.680 × 3.70	= 2.516
		<hr/>
		Σ 18,280 t

ΣΣ = 29,793 t

Y₁X₂ 柱 (C₅) 2階

103100t	0.114 × 6.21	= 0.707
スラット	0.532 × 2.71 × 3.5	= 5.040
梁	0.345 × 2.455	= 0.846
梁	0.445 × 3.05	= 1.357
トラス	0.244 × 2.355/2	= 0.322
柱	0.680 × 2.75	= 1.870
		<hr/>
		Σ 10,142 t

19%

237	0.612 × 3.3 × 2.111	= 4.413
10710	0.114 × 4.05	= 0.461
136	0.532 × 4.05 × 3.51	= 7.162
72	0.345 × 2.435	= 0.846
77	0.765 × 3.04	= 2.334
42	0.529 × 2.717	= 1.444
14	0.345 × 3.12	= 1.076
柱	1.008 × 4.45	= 4.574
17	0.278 × 2.58/2	= 0.353

Σ = 24.693

ΣΣ = 34.815 t

X=2Y, 柱(C6)
前同様

21%

Σ = 10.142 t

19%

237	0.612 × 1.79 × 2.111	= 2.968
10710	0.573 × 1.5 × 2.70	= 3.631
柱	0.508 × 4.45	= 3.595
其の他	同上	= 14.165

Σ = 24.363 t

ΣΣ = 34.505 t

Y0 X3 柱(C7)

11310	0.114 × 11.46	= 1.340
237	0.532 × 2.51 × 4.05	= 7.519
72(X)	0.529 × 3.72	= 1.967
77(Y)	0.487 × 3.22	= 1.565
14	0.345 × 3.37	= 1.162
柱	0.808 × 4.45	= 3.595

Σ = 17.101 t

Y1 X3 柱(C5)

10.1 t

Σ = 17.101 t

水平力算定

2階

ハコブ	0.114 × 33.18	= 3.782
スラブ	0.452 × 6.59 × 10	= 29.786
梁	0.345 × 20	= 6.900
下梁	0.274 × 10	= 2.740
梁	0.445 × 6.59 × 3	= 8.797
柱	0.680 × 3.5/2 × 6	= 7.140
内壁	0.368 × 9.3 × 1.40	= 4.784
外壁	0.440 × 10 × 1.40	= 6.160
		<hr/>
		66.489 t

1階

ハコブ	0.114 × 23.2	= 2.644
2階柱	0.68 × 3.5/2 × 6	= 7.140
スラブ厚板	0.452 × 7.02 × 8.09	= 25.669
テラス	0.640 × 2.5 × 4.59	= 7.344
ロビー一室床	0.672 × 4.09 × 4.59	= 12.615
夜間倉庫	0.542 × 5.41 × 5.09	= 14.924
階段	0.773 × 1.50 × 2.71	= 3.142
梁	0.345 × 10 × 3	= 10.350
"	0.529 × 8.09 × 2	= 8.559
梁	0.487 × 7.02	= 3.418
"	0.765 × 7.02	= 5.391
"	0.445 × 6.59 × 2	= 5.832
下梁	0.345 × 7.02 × 2	= 4.843
柱	0.680 × 3.5/2 × 4	= 4.760
下梁	0.274 × 10	= 2.740
内壁	0.368 × 2.3 × 2.55	= 2.412
"	0.368 × 4.6 × 1.45	= 2.454
外壁	0.440 × 10 × 1.45	= 6.380
"	0.440 × 20 × 1.45	= 12.760
柱	0.808 × 3.5/2 × 3	= 4.242
柱	1.028 × 3.5/2 × 1	= 1.799

余り尾柱	0.452 × 3 × 1.6	= 2.169
" 壁	0.440 × 6 × 1.5	= 3.960
車庫壁	0.440 × 11 × 1.8	= 8.712
		<hr/>
		161.389 t

2階 水平力

66.489 × 0.2 = 13.297 t

1階 水平力

227.848 × 0.2 = 45.569 t

P₁ = 13.297 t

P₂ = (68.641 + 66.489) × 0.2 = 27.026 t

P₃ = 227.848 × 0.2 = 45.569 t

	水質の Kapu		柱の長さ (y 平均)	
	X ₀	X ₁	X ₂	X ₃
K	1.02	1.23	1.60	1.60
a	0.337	0.380	0.44	0.44
D	0.45	0.51	0.83	0.83
y	0.401	0.412	0.43	0.43
	1.05	1.27	0.72	2.75
	0.50	0.54	0.44	0.68
	0.66	0.70	2.80	1.12
	0.597	0.586	0.60	0.55

2階柱	計算	平均
0.45 x 2	1.67 x 3.50 x 0.401 = 2.34	3.50
0.51 x 2	1.89 x 3.50 x 0.412 = 2.72	3.88
0.53 x 2	3.08 x 3.15 x 0.43 = 4.17	5.53
Σ 3.58	Σ 13.297	

1階柱	計算	平均
0.66 x 2	3.76 x 3.90 x 0.597 = 8.75	5.90
0.70 x 2	3.99 x 3.90 x 0.586 = 9.11	6.44
2.50 x 1	15.98 x 4.35 x 0.600 = 41.70	27.80
1.12 x 1	6.39 x 4.35 x 0.55 = 15.28	12.50
0.67 x 2	3.82 x 4.70 x 0.55 = 9.87	8.07
Σ 7.98	Σ 45.569	

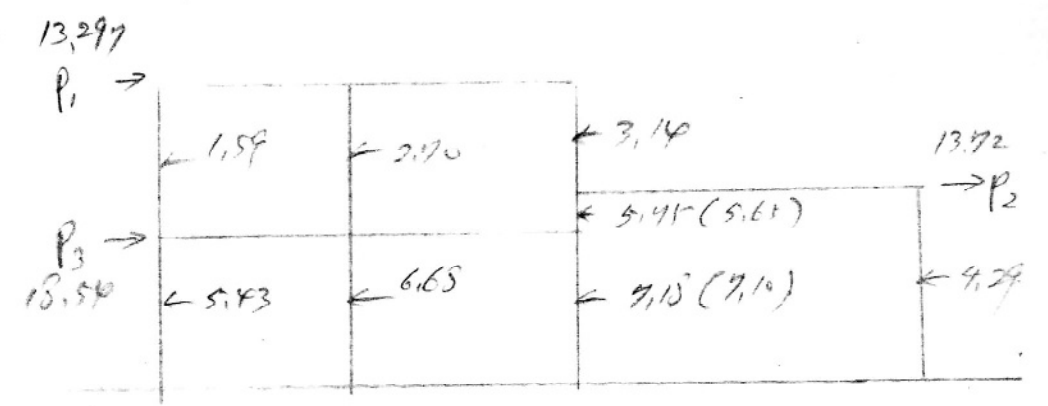
	(x 平均)		
	Y ₀		
K	0.94	1.77	0.91
	0.31	0.46	0.31
	0.43	0.63	0.50
	0.40	0.438	0.35
			0.15
			0.07
			0.65
			0.525
			0.53
			0.40
			0.86
			0.70
	0.96	1.81	
	0.49	0.60	
	0.65	0.80	
	0.60	0.56	

	(x 平均)		
	Y ₁		
K	0.94	1.77	0.91
	0.31	0.46	0.31
	0.43	0.63	0.50
	0.40	0.438	0.35
			0.26
			0.11
			0.64
			0.47
			0.57
			0.41
			0.85
			0.70
	0.96	1.81	
	0.49	0.60	
	0.65	0.80	
	0.60	0.56	

$$D_1 = \frac{1}{\frac{1}{0.65} \left(\frac{0.675}{3.500}\right)^2 + \frac{1}{0.50} \left(\frac{2.825}{3.500}\right)^2} = 0.736 \quad Y_0$$

$$D_2 = \frac{1}{\frac{1}{0.64} \left(\frac{0.675}{3.500}\right)^2 + \frac{1}{0.50} \left(\frac{2.825}{3.500}\right)^2} = 0.735 \quad Y_1$$

又方向



2階算定	Q	振脚	振脚
0.43x2	1.59 x 3.50 x 0.40 = 2.22	3.33	
0.63x2	2.170 x 3.50 x 0.425 = 4.14	5.31	
0.73x2	3.14 x 2.825 x 0.35 = 3.10	5.76	
$\Sigma 3.58$		$P_1 = 13.297$	

右辺算定

$$D_1 = \frac{1}{\frac{1}{0.86} \left(\frac{3.90}{4.545} \right)^2 + \frac{1}{0.65} \left(\frac{0.675}{4.545} \right)^2} \quad Y_0$$

$$= 1.14$$

$$D_1 = \frac{1}{\frac{1}{0.85} \left(\frac{3.90}{4.545} \right)^2 + \frac{1}{0.65} \left(\frac{0.675}{4.545} \right)^2} \quad Y_1$$

$$= 1.12$$

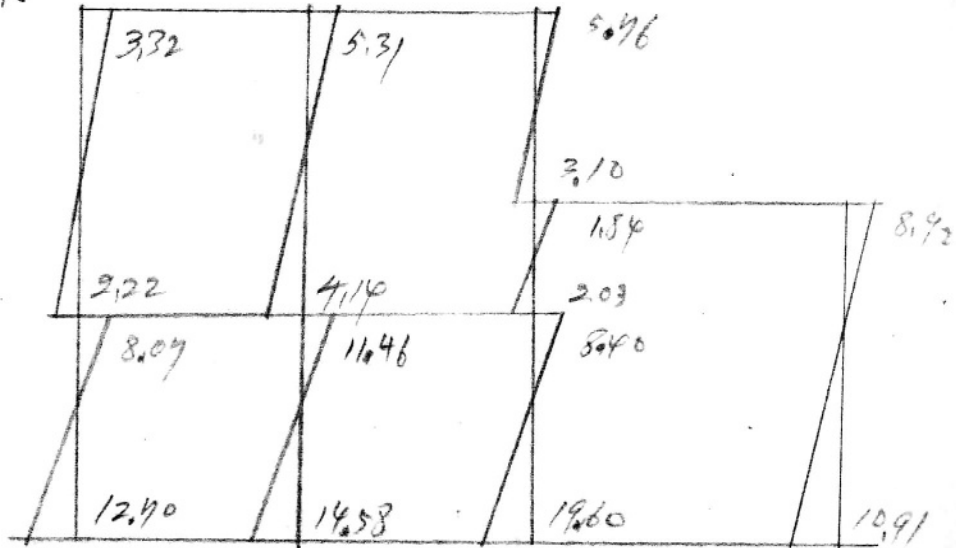
1.14 x 1	5.75 x 0.675 x 0.525 = 2.03	1.84 Y ₀
1.12 x 1	5.65 x 0.675 x 0.475 = 1.79	2.02 Y ₁
0.85 x 2	4.29 x 4.625 x 0.55 = 10.91	8.92
$\Sigma 3.96$	$(3.14 \times 2 + 13.72) = 20.1$	P_2

1階算定

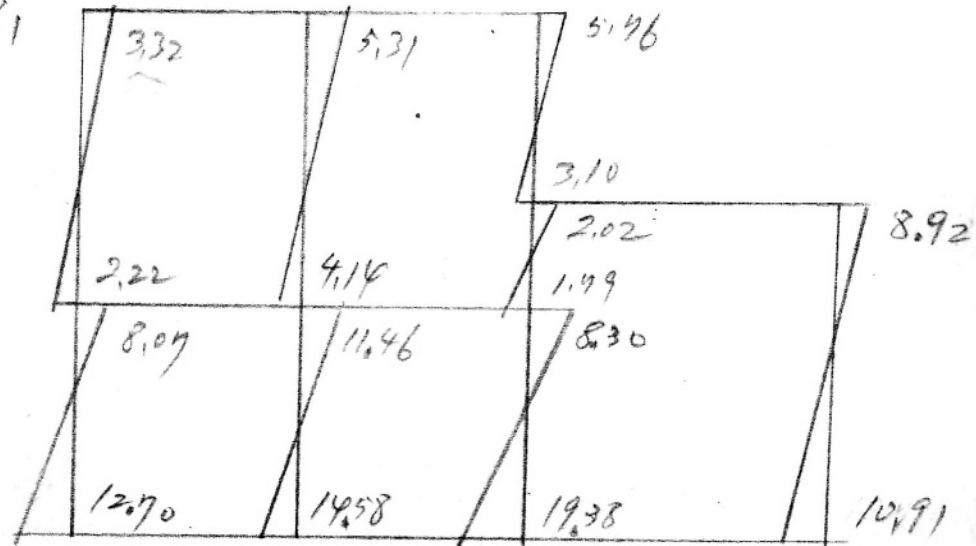
0.65 x 2	5.42 x 3.90 x 0.60 = 12.70	8.47
0.80 x 2	6.68 x 3.90 x 0.56 = 14.58	11.46
0.86 x 1	7.18 x 3.90 x 0.70 = 19.60	8.90
0.85 x 1	7.10 x 3.90 x 0.70 = 19.38	8.30
$\Sigma 4.61$	$1.59 \times 2 + 2.170 \times 2 + 5.75 + 5.65 + 18.54$	P_3
	$= 38.52$	

水平加圧の様子

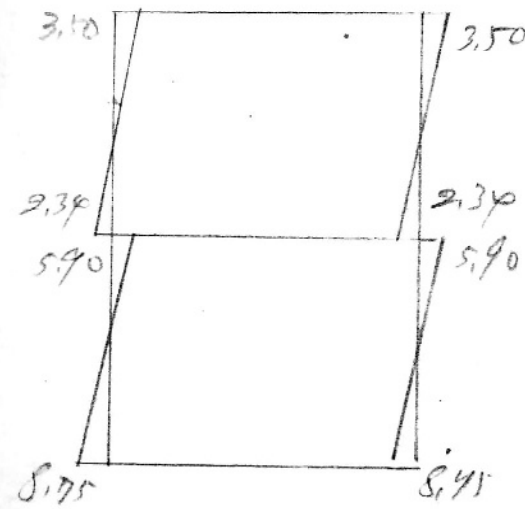
Y₀



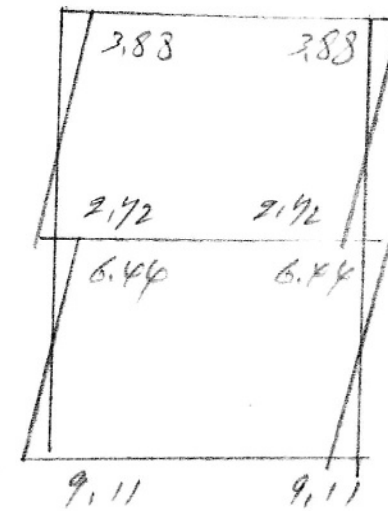
Y₁



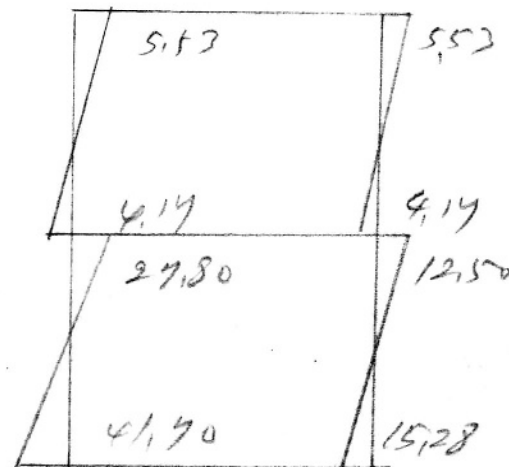
X₀



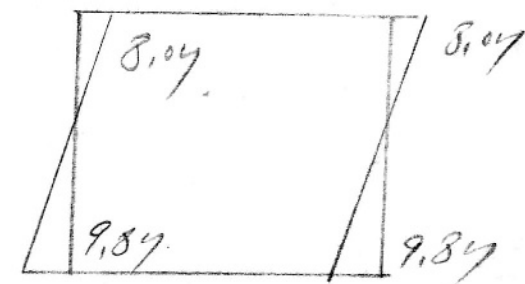
X₁



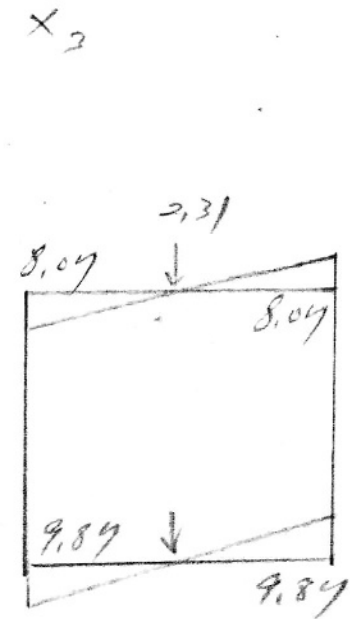
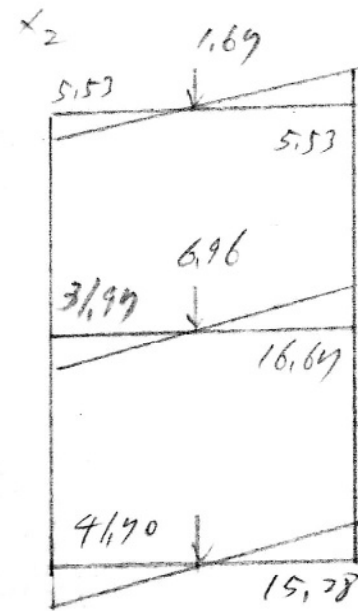
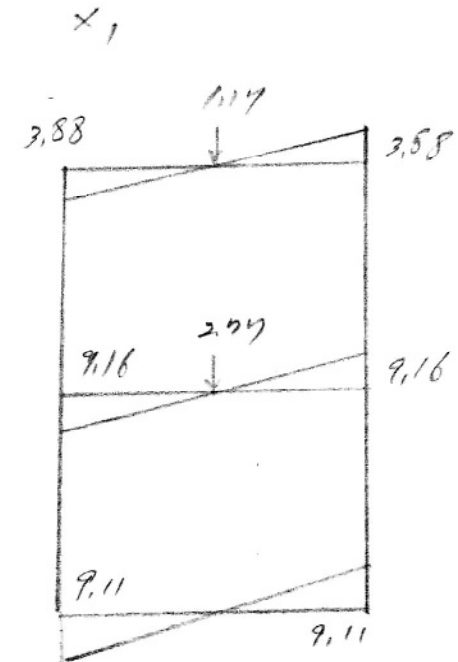
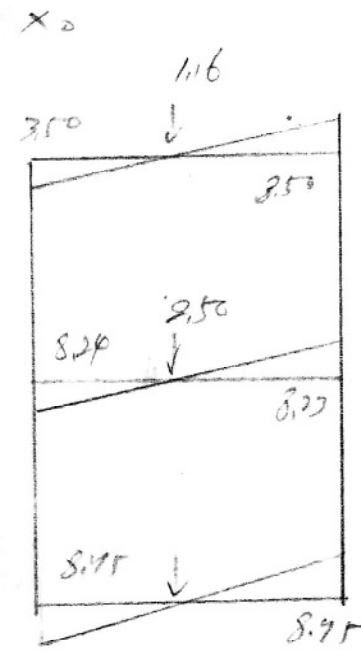
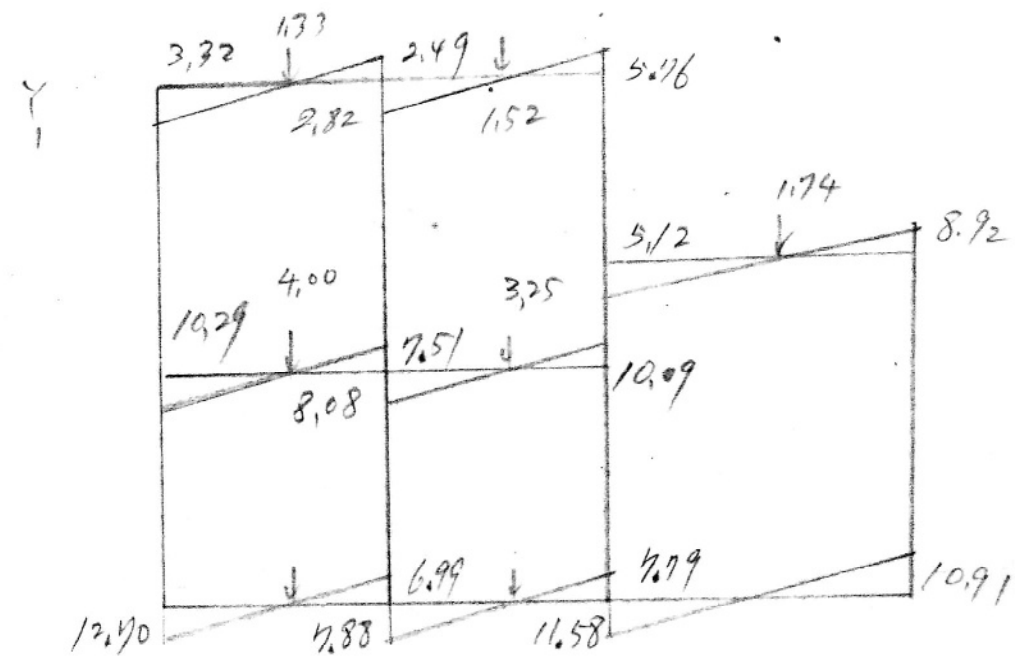
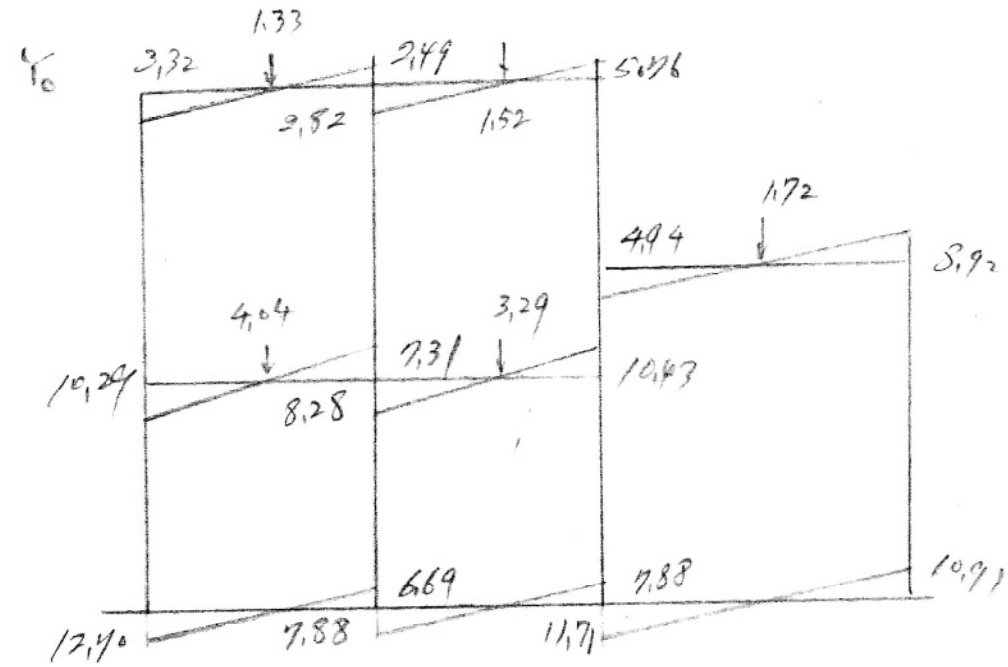
X₂



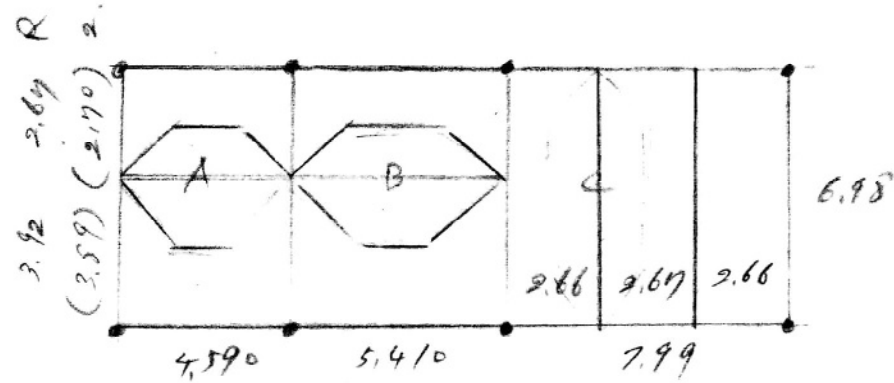
X₃



水平力作用下的冲力图



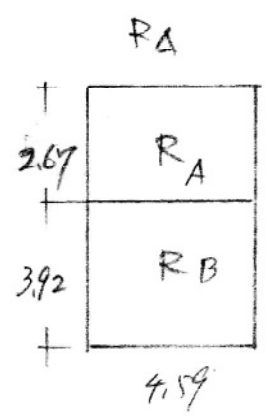
小字の等価



$$\begin{aligned}
 1) \quad R_{Am} &= \frac{1}{8} \times 4.59^2 \times 0.214 = 0.721 \quad \text{F} \\
 I_y / I_x &= 4.59 / 1.65 = 2.78 \\
 P_{Am} &= 2 \times 1.60 \times 0.532 = 1.702 \quad \text{Z37} \\
 R_{Am} &= \frac{0.721}{1.702} = 0.423 \quad \text{t/m} \\
 \\
 2) \quad R_{Bm} &= \frac{1}{8} \times 5.4^2 \times 0.214 = 0.995 \quad \text{F} \\
 I_y / I_x &= 5.41 / 1.65 = 3.278 \\
 R_{Bm} &= 2 \times 2.8 \times 0.532 = 2.979 \quad \text{Z37} \\
 R_{Bm} &= \frac{0.995}{2.979} = 0.334 \quad \text{t/m} \\
 \\
 3) \quad R_{Cm} &= \frac{1}{8} \times 6.98^2 \times 0.345 = 2.10 \quad \text{F} \\
 &= \frac{1}{8} \times 6.98^2 \times 0.532 \times 2.66 = 8.61 \quad \text{Z37} \\
 R_{Cm} &= \frac{2.10}{8.61} = 0.244 \quad \text{t/m}
 \end{aligned}$$

$$\begin{aligned}
 4) \quad \Sigma A_{m1} &= 0.721 \quad \text{F} \\
 &= 2 \times 1.60 \times 0.741 = 2.371 \quad \text{Z37} \\
 \Sigma A_{m1} &= 3.092 \quad \text{t/m} \\
 \\
 5) \quad \Sigma B_{m1} &= 0.998 \quad \text{F} \\
 &= 2 \times 2.8 \times 0.612 = 3.427 \quad \text{Z37} \\
 \Sigma B_{m1} &= 4.425 \quad \text{t/m} \\
 \\
 6) \quad I_{Cm} &= \frac{1}{8} \times 0.836 \times 2.66 \times 6.98^2 = 13.54 \quad \text{t/m} \quad \text{Z37} \\
 &= 2.10 \quad \text{t/m} \\
 I_{Cm} &= 15.64 \quad \text{t/m} \\
 \\
 7) \quad I_{Am} &= \frac{1}{8} \times 4.59^2 \times 0.214 = 0.721 \quad \text{F} \\
 &= 2 \times 1.60 \times 0.528 = 1.659 \quad \text{Z37} \\
 I_{Am} &= 2.410 \quad \text{t/m} \\
 \\
 C &= 3.96 \quad R_A = 0.22 \quad \text{at} = 2.97 \text{ cm}^2 \\
 &= 2.019 - 5.70 \text{ cm}^2 \\
 \\
 8) \quad I_{Bm} &= \frac{1}{8} \times 5.40^2 \times 0.214 = 0.998 \quad \text{F} \\
 &= 2 \times 2.80 \times 0.528 = 2.956 \quad \text{Z37} \\
 I_{Bm} &= 3.954 \quad \text{t/m} \\
 \\
 C &= 6.51 \quad R_A = 0.37 \quad \text{at} = 4.995 \text{ cm}^2 \\
 &= 2.019 - 5.70 \text{ cm}^2
 \end{aligned}$$

1. スラブの算定



$w = 592 \text{ kg/m}^2$ スラブ 12

$l_x = 2.67 \quad l_y = 4.59$

$w_x = \frac{4.59^4}{4.59^4 + 2.67^4} \times 0.592 = 0.531 \text{ /m}^2$

6.59

短辺 $m_{x1} = -\frac{1}{12} \times 0.531 \times 2.67^2 = 0.131$

$m_{x2} = \frac{1}{18} \times 0.531 \times 2.67^2 = 0.121$

長辺 $m_{y1} = -\frac{1}{24} \times 0.592 \times 2.67^2 = 0.117$

$m_{y2} = \frac{1}{36} \times 0.592 \times 2.67^2 = 0.11$

D10φ

$b_{x1} = 1.4 \times 0.91 \times 9 / 0.31 = 28.8 \text{ --- } \textcircled{20} \text{ D10φ}$

$b_{x2} = 1.4 \times 0.91 \times 9 / 0.21 = 42.6 \text{ --- } \textcircled{30-20}$

$b_{y1} = 1 \times 8 / 0.117 = 46.7 \text{ --- } \textcircled{30}$

$b_{y2} = 1 \times 8 / 0.11 = 72.2 \text{ --- } \textcircled{30}$

RB $l_w = 3.92 \quad l_y = 4.59$

$w_x = \frac{4.59^4}{4.59^4 + 3.92^4} \times 0.592 = 0.386$

短辺 $m_{x1} = -\frac{1}{12} \times 0.386 \times 3.92^2 = 0.49$

$m_{x2} = \frac{1}{18} \times 0.386 \times 3.92^2 = 0.329$

長辺 $m_{y1} = -\frac{1}{24} \times 0.592 \times 3.92^2 = 0.379$

$m_{y2} = \frac{1}{36} \times 0.592 \times 3.92^2 = 0.252$

D10φ

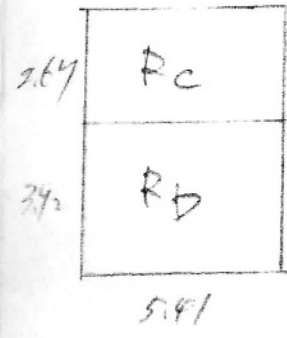
$b_{x1} = 1.4 \times 1.29 \times 9 / 0.49 = 32.6 \text{ --- } \textcircled{20} \text{ D13φ}$

$b_{x2} = 1.4 \times 0.91 \times 9 / 0.329 = 29.19 \text{ --- } \textcircled{20} \text{ D10φ}$

$b_{y1} = 1.4 \times 0.91 \times 8 / 0.379 = 20.95 \text{ --- } \textcircled{20} \text{ D10φ}$

$b_{y2} = 1.4 \times 0.91 \times 8 / 0.252 = 31.55 \text{ --- } \textcircled{20} \text{ D10φ}$

RC スラブ



$w_x = \frac{5.41^4}{5.41^4 + 2.67^4} \times 0.592 = 0.555$

短辺 $m_{x1} = -\frac{1}{12} \times 0.555 \times 2.67^2 = 0.133$

$m_{x2} = \frac{1}{18} \times 0.555 \times 2.67^2 = 0.122$

長辺 $m_{y1} = -\frac{1}{24} \times 0.592 \times 2.67^2 = 0.117$

$m_{y2} = \frac{1}{36} \times 0.592 \times 2.67^2 = 0.11$

$b_{x1} = 1.4 \times 0.91 \times 9 / 0.33 = 29.1 \text{ --- } \textcircled{20} \text{ D10φ}$

$b_{x2} = 1.4 \times 0.91 \times 9 / 0.22 = 40.6 \text{ --- } \textcircled{30-20} \text{ D10φ}$

$b_{y1} = 1.4 \times 0.91 \times 8 / 0.117 = 46.7 \text{ --- } \textcircled{20} \text{ D10φ}$

$b_{y2} = 1.4 \times 0.91 \times 8 / 0.11 = 72.2 \text{ --- } \textcircled{30} \text{ D10φ}$

RD $w_x = \frac{5.41^4}{5.41^4 + 3.92^4} \times 0.592 = 0.464$

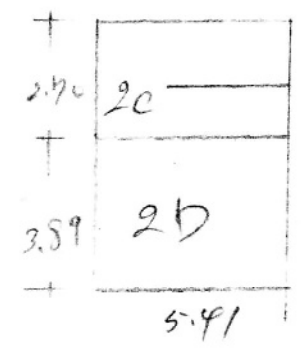
短辺 $m_{x1} = -\frac{1}{12} \times 0.464 \times 3.92^2 = 0.594$

$m_{x2} = \frac{1}{18} \times 0.464 \times 3.92^2 = 0.376$

長辺 $m_{y1} = -\frac{1}{24} \times 0.592 \times 3.92^2 = 0.379$

$m_{y2} = \frac{1}{36} \times 0.592 \times 3.92^2 = 0.252$

$$\begin{aligned}
 b_{x1} &= 1.4 \times 1.24 \times 9 / 0.531 = 19.2 \quad \text{---} \quad 15 \text{ a } \odot \text{ D134} \\
 b_{x2} &= 1.4 \times 1.24 \times 9 / 0.554 = 23.3 \quad \text{---} \quad 20 \text{ a } \odot \text{ " } \\
 b_{y1} &= 1.4 \times 1.24 \times 8 / 0.162 = 25.2 \quad \text{---} \quad 20 \text{ a } \odot \text{ " } \\
 b_{y2} &= 1.4 \times 1.24 \times 8 / 0.374 = 33.0 \quad \text{---} \quad 30 \text{ a } \odot \text{ " }
 \end{aligned}$$

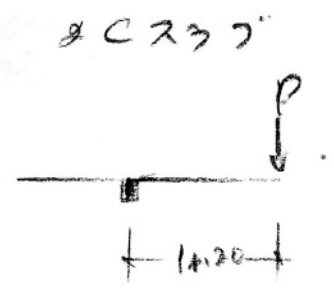


20 x 3.59
 $w = 662 \text{ kg/m}^2$

$$w = \frac{5.41^4}{5.41^4 + 3.59^4} \times 0.662 = 0.522$$

$$\begin{aligned}
 I_{x1} &= \frac{1}{12} \times 0.522 \times 3.59^2 = 0.618 \\
 I_{x2} &= \frac{1}{18} \times 0.522 \times 3.59^3 = 0.438 \\
 I_{y1} &= \frac{1}{24} \times 0.662 \times 3.59^3 = 0.417 \\
 I_{y2} &= \frac{1}{36} \times 0.662 \times 2.59^3 = 0.248
 \end{aligned}$$

$$\begin{aligned}
 b_{x1} &= 1.4 \times 1.24 \times 9 / 0.618 = 24.3 \quad \text{---} \quad 20 \text{ a } \odot \text{ D134} \\
 b_{x2} &= 1.4 \times 0.71 \times 9 / 0.438 = 20.4 \quad \text{---} \quad 20 \text{ a } \odot \text{ D10} \\
 b_{y1} &= 1.4 \times 1.24 \times 8 / 0.417 = 34.1 \quad \text{---} \quad 20 \text{ a } \odot \text{ D134} \\
 b_{y2} &= 1.4 \times 0.71 \times 8 / 0.248 = 28.9 \quad \text{---} \quad 20 \text{ a } \odot \text{ D100}
 \end{aligned}$$



$$\begin{aligned}
 M &= \frac{1}{2} \times 0.662 \times 1.2^2 = 0.476 \\
 M' &= 0.121 \times 1.2 = 0.1452 \\
 P &= 0.06 \times 3.5 = 0.21 \text{ t/m} \\
 &= \frac{0.21}{2} = 0.105 \text{ t/m}
 \end{aligned}$$

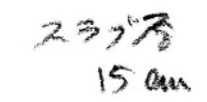
$M = at$
 $at = 172800 / (1600 \times 8) = 5.68 \text{ cm}^2$

D134 20 cm \odot F/2.2.1.11-1.2.2.1
 $w = 880 \text{ kg/m}^2$

$$w_x = \frac{6.94^4}{6.94^4 + 2.63^4} \times 0.880 = 0.859$$

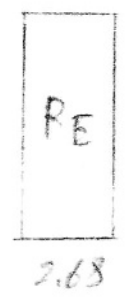


$$\begin{aligned}
 I_{x1} &= \frac{1}{12} \times 0.859 \times 2.63^2 = 0.514 \\
 I_{x2} &= \frac{1}{18} \times 0.859 \times 2.63^3 = 0.342 \\
 I_{y1} &= \frac{1}{24} \times 0.880 \times 2.63^3 = 0.263 \\
 I_{y2} &= \frac{1}{36} \times 0.880 \times 2.63^3 = 0.195
 \end{aligned}$$



$$\begin{aligned}
 b_{x1} &= 1.4 \times 0.71 \times 12 / 0.514 = 23.2 \quad \text{---} \quad 20 \text{ a} \\
 b_{x2} &= 1.4 \times 0.71 \times 12 / 0.342 = 34.8 \quad \text{---} \quad 30 \text{ a} \\
 b_{y1} &= 1.4 \times 0.71 \times 11 / 0.263 = 41.5 \quad \text{---} \quad 30 \text{ a} \\
 b_{y2} &= 1.4 \times 0.71 \times 11 / 0.195 = 62.4 \quad \text{---} \quad 30 \text{ a}
 \end{aligned}$$

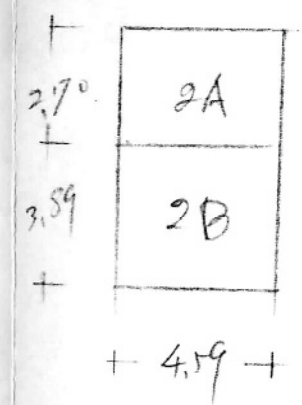
$$\begin{aligned}
 bx' &= 1.4 \times 1.27 \times 9 / 0.594 = 26.4 - 20 \\
 bx'' &= 1.4 \times 0.71 \times 9 / 0.396 = 22.5 - 20 \\
 by' &= 1.4 \times 0.71 \times 8 / 0.2799 = 20.9 - 20 \\
 by'' &= 1.4 \times 0.71 \times 5 / 0.252 = 31.5 - 20
 \end{aligned}$$



$$\begin{aligned}
 \bar{W}_x &= \frac{6.94^2}{6.94 + 2.65} \times 0.592 = 0.549 \\
 \bar{W}_y &= \frac{1}{12} \times 0.549 \times 2.65^2 = 0.34 \\
 \bar{W}_x &= \frac{1}{18} \times 0.549 \times 2.65^2 = 0.23 \\
 \bar{W}_y &= \frac{1}{24} \times 0.549 \times 2.65^2 = 0.177 \\
 \bar{W}_y &= \frac{1}{36} \times 0.592 \times 2.65^2 = 0.11
 \end{aligned}$$

$$\begin{aligned}
 bx' &= 1.4 \times 0.71 \times 9 / 0.34 = 26.3 - 20 \\
 bx'' &= 1.4 \times 0.71 \times 9 / 0.23 = 35.5 - 30 \\
 by' &= 1.4 \times 0.71 \times 8 / 0.177 = 44.9 - 30 \\
 by'' &= 1.4 \times 0.71 \times 5 / 0.11 = 72.2 - 30
 \end{aligned}$$

$$\begin{aligned}
 bx' &= 1.4 \times 1.27 \times 4 / 0.531 = 19.25 @ 15 \\
 bx'' &= 1.4 \times 0.71 \times 9 / 0.554 = 16.14 @ 15 \\
 by' &= 1.4 \times 1.27 \times 8 / 0.562 = 25.3 @ 20 \\
 by'' &= 1.4 \times 0.71 \times 8 / 0.344 = 21.2 @ 20
 \end{aligned}$$



$$\begin{aligned}
 2A \times 77'' \quad W &= 460 \text{ kg/m}^2 \\
 \bar{W}_x &= \frac{4.19^2}{4.19 + 3.70} \times 0.46 = 0.648
 \end{aligned}$$

$$\begin{aligned}
 \bar{W}_x &= \frac{1}{12} \times 0.648 \times 2.7^2 = 0.41 \\
 \bar{W}_x &= \frac{1}{18} \times 0.648 \times 2.7^2 = 0.27 \\
 \bar{W}_y &= \frac{1}{24} \times 0.460 \times 2.4^2 = 0.23 \\
 \bar{W}_y &= \frac{1}{36} \times 0.46 \times 2.4^2 = 0.15
 \end{aligned}$$

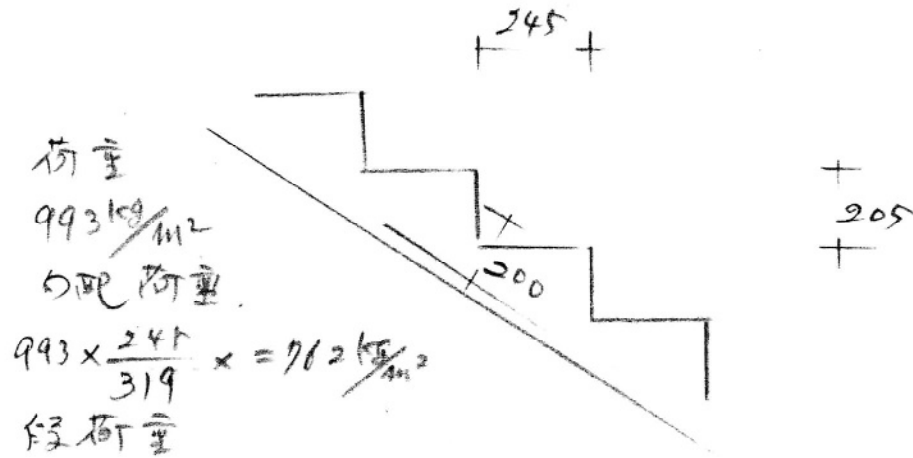
$$\begin{aligned}
 bx' &= 1.4 \times 0.71 \times 9 / 0.41 = 21.8 - 20 \\
 bx'' &= 1.4 \times 0.71 \times 9 / 0.27 = 33.1 - 30 \\
 by' &= 1.4 \times 0.71 \times 8 / 0.23 = 39.5 - 30 \\
 by'' &= 1.4 \times 0.71 \times 5 / 0.15 = 53 - 30
 \end{aligned}$$

$$\begin{aligned}
 2B \times 77'' \quad W &= 892 \text{ kg/m}^2 \\
 \bar{W}_x &= \frac{4.19^2}{4.19 + 3.59} \times 0.892 = 659 \text{ kg/m}^2
 \end{aligned}$$

$$\begin{aligned}
 \bar{W}_x &= \frac{1}{12} \times 0.659 \times 3.59^2 = 0.831 \\
 \bar{W}_x &= \frac{1}{18} \times 0.659 \times 3.59^2 = 0.554 \\
 \bar{W}_y &= \frac{1}{24} \times 0.892 \times 3.59^2 = 0.562 \\
 \bar{W}_y &= \frac{1}{36} \times 0.592 \times 3.59^2 = 0.374
 \end{aligned}$$



階段算定



荷重
993 kg/m²
の配荷重

$$993 \times \frac{245}{319} = 762 \text{ kg/m}^2$$

段荷重

$$762 \times \frac{245}{1000} = 186.7 \text{ kg/m}^2$$

$$M = \frac{1}{2} \times 0.1867 \times 1.5^2 = 0.21 \text{ tm}$$

$$d = 20 \quad j = 17$$

$$AT = 21000 / 1600 \times 17 = 0.79 \text{ cm}^2$$

D13-1

壁補強筋

$$M = 0.21 \times \frac{100}{24.5} \times 0.65 = 0.557 \text{ tm}$$

$$b = 15 \quad d = 12 \quad j = 10.5$$

$$AT = 55700 / 1600 \times 10.5 = 3.32 \text{ cm}^2$$

9φ @ 10cm 筋筋とす

踊場印合算定

スラブ 12
元付
種裁

288

60

550

898 kg/m²

$$M = \frac{1}{2} \times 0.898 \times 1.5^2 = 1.01 \text{ tm}$$

$$b = 12 \quad d = 9 \quad j = 7.8$$

$$AT = 1.01000 / 1600 \times 7.8 = 8.09 \text{ cm}^2$$

$$D16 - 20 \text{ cm} \rightarrow (2-13\phi) - 20 \text{ cm}$$

(X-Y方向に)

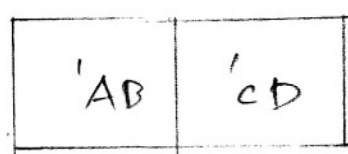
壁補強筋

$$M = 0.65 \times 1.01 = 0.656 \text{ tm}$$

$$AT = 65650 / 1600 \times 10.5 = 3.90 \text{ cm}^2$$

9φ @ 10cm 筋筋とす

1階 270° 配筋



1A, 1B 230°

$$w = 0.648 \text{ t/m}^2$$

$$wx = \frac{4.194}{4.194 + 3.30} \times 0.648 = 0.511$$

+ 4.19 + 3.30 +

短辺 $x_1 = \frac{1}{12} \times 0.511 \times 3.3^2 = 0.463$

$x_2 = \frac{1}{18} \times 0.511 \times 3.3^2 = 0.309$

長辺 $y_1' = \frac{1}{24} \times 0.648 \times 3.3^2 = 0.294$

$y_2' = \frac{1}{36} \times 0.648 \times 3.3^2 = 0.196$

$bx_1 = 1.4 \times 0.41 \times 9 / 0.511 = 14.5$ D10φ - 15@

$bx_2 = 1.4 \times 0.41 \times 9 / 0.463 = 19.3$ D10φ - 15@

$by_1' = 1.4 \times 0.41 \times 8 / 0.309 = 25.7$ D10φ - 20@

$by_2' = 1.4 \times 0.41 \times 8 / 0.196 = 40.5$ D10φ - 30@

1A 1B 270°

$$wx = \frac{5.414}{5.414 + 3.30} \times 0.648 = 0.569 \text{ t/m}^2$$

短辺 $x_1 = \frac{1}{12} \times 0.569 \times 3.3^2 = 0.516$

$x_2 = \frac{1}{18} \times 0.569 \times 3.3^2 = 0.344$

$y_1' = \frac{1}{24} \times 0.648 \times 3.3^2 = 0.294$

$y_2' = \frac{1}{36} \times 0.648 \times 3.3^2 = 0.196$

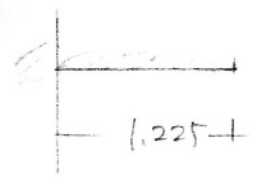
$bx_1 = 1.4 \times 0.41 \times 9 / 0.516 = 14.32$ D10φ - 15@

$bx_2 = 1.4 \times 0.41 \times 9 / 0.344 = 26.00$ D10φ - 20@

$by_1' = 1.4 \times 0.41 \times 8 / 0.294 = 29.00$ D10φ - 20@

$by_2' = 1.4 \times 0.41 \times 8 / 0.196 = 40.0$ D10φ - 30@

底の算定



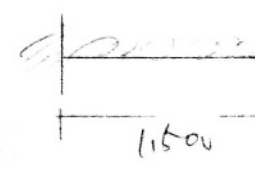
$$w = 0.592 \text{ t/m}^2$$

$$m = \frac{1}{2} \times 0.592 \times 1.225^2 = 0.444 \text{ tm}$$

$$m = atj \quad j = 9 \times \frac{7}{8} = 7.875$$

$$at = 44400 / 1600 \times 7.875 = 3.52 \text{ cm}^2$$

D13 - @ 200 ±筋

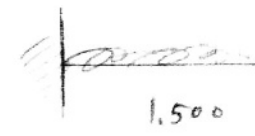


$$m = \frac{1}{2} \times 0.592 \times 1.5^2 = 0.666 \text{ tm}$$

$$j = 15 \times \frac{7}{8} = 13.12$$

$$at = 66600 / 1600 \times 13.12$$

$$= 3.17 \text{ cm}^2 \quad \text{D13φ - @ 200 ±筋}$$



$$w = 0.75 \text{ t/m}^2 \text{ (±内配筋)}$$

$$m = \frac{1}{2} \times 0.75 \times 1.5^2 = 0.843$$

$$j = 12 \times \frac{7}{8} = 10.5$$

$$at = 84300 / 1600 \times 10.5 = 5.01 \text{ cm}^2$$

D13φ - @ 200 ±筋

→ 0.17層 1.00t/m²
布基礎に支持せしめ。



$$w = 0.592 \text{ t/m}^2$$

$$m = \frac{1}{2} \times 0.592 \times 0.6^2 = 0.106 \text{ tm}$$

$$at = 10600 / 1600 \times 7.875 = 0.84 \text{ cm}^2$$

D10 - @ 250

全屋面窗边 窗 窗量算定

C1 C2 x 2层 2.05 x 3.5 = 7.175
 1层 2.05 x 3.5 = 7.175
 y 2层 3.05 x 3.5 = 10.675
 1层 3.05 x 3.5 = 10.675
 外窗 = 35.70 m²

C3 C4 x 2层 4.5 x 3.5 = 15.75
 1层 4.5 x 3.5 = 15.75
 外窗 = 31.50 m²

C5 C6 x 2层 2.45 x 3.5 = 8.575
 1层 2.45 x 3.5 = 8.575
 y 2层 2.05 x 2.55 = 5.227
 x 1层 3.45 x 4.25 = 14.6625
 外窗 = 37.1275 m²

C7 C8 x 1层 3.45 x 4.25 = 14.6625
 y 1层 3.22 x 4.25 = 13.685
 外窗 = 28.3475 m²

窗口卸深 12 吋 减量

C1 窗 减 x 2层 2.05 x 0.60 = 1.23
 2层 1.80 x 0.30 = 0.54
 1层 1.90 x 1.30 = 2.47
 1层 2.05 x 0.60 = 1.23
 y 2层 0.60 x 0.50 = 0.30
 " 0.65 x 3.05 = 1.98
 1层 0.65 x 3.05 = 1.98
 1层 1.80 x 0.30 = 0.54
 = -10.27 m²

C2 窗 减 x 2层 2.05 x 0.60 = 1.23
 2层 2.05 x 1.70 = 3.48
 x 1层 2.05 x 0.60 = 1.23
 x 1层 2.00 x 2.00 = 4.00
 y 2层 0.65 x 3.05 = 1.98
 1层 1.80 x 0.90 = 1.62
 1层 0.65 x 3.05 = 1.98
 1层 1.80 x 0.30 = 0.54
 = -16.06 m²

C3 窗 x 2 1 前窗(左) = 5.44
 x 2 2层 2.05 x 0.60 = 1.23
 窗 0.6 x 0.6 = 0.36
 x 1 2层 2.05 x 0.60 = 1.23
 = -12.76 m²

C4 窗 x 2 1 前窗(左) = 9.94
 x 2 窗 1.2 x 0.6 = 0.72
 2层 2.05 x 0.6 = 1.23
 x 1 2层 2.05 x 0.6 = 1.23
 窗 1.2 x 0.6 = 0.72
 = -13.84 m²

C5 窗 x 2 1 2层 2.45 x 0.6 x 2 = 2.94
 2 窗 2.8 x 0.6 = 1.68
 x 1 1层 1.8 x 2.0 = 3.60
 x 1 1层 3.5 x 3.5 = 12.25
 y 2 2层 3.05 x 0.65 = 1.98
 " 窗 2.90 x 0.6 = 1.74
 x 1 2层 0.75 x 3.75 = 2.81
 = -27.00

28

C6 柱

x2 柱	2.45 x 0.6	=	1.47
x1 柱	2.45 x 0.6	=	1.47
窗	1.20 x 0.6	=	0.72
门	3.5 x 3.5	=	12.25
窗	3.75 x 0.75	=	2.81
		Σ	= 18.72 m ²

C7 柱

x1 柱	3.45 x 0.45	=	2.81
门	3.50 x 3.5	=	12.25
y 柱	3.22 x 0.4	=	2.25
		Σ	= 17.31 m ²

C8 柱

x1 柱	3.45 x 0.45	=	2.81
门	3.50 x 3.50	=	12.25
y 柱	3.22 x 0.4	=	2.25
窗	1.90 x 2.00	=	2.80
		Σ	= 20.11

内层

C1 柱 $(3.0 \times 2.3 - 0.5 \times 0.6 - 0.2 \times 0.8) \times \frac{1}{2} =$ 外 3.22 m²

C2 柱 $=$ 外 3.22 m²

C3 柱 $3.0 \times 1.5 - 2 \times 0.8 = 4.290$ m²

$3.2 \times 3 / 2 = 7.5, 00$ m²

C4 柱 $= 7.5, 00$ m²

$2.4 \times 2.9 = 6.96$ m²

$2.0 \times 2.9 = 5.80$ m²

C5 柱 $3.22 \times 2.05 - 0.6 \times 1.1 - 1.8 - 1.9 = 5.74$ m²

C6 柱 $4 \times 3.05 = 12.2$ m²

外窗 $15 \times 2.4 = 360$ kg
岩棉板 20%

外窗 $12 \times 2.4 = 288$ kg
岩棉板 50%

外窗 $15 \times 2.4 = 360$ kg
岩棉板 100%

外窗(新) $15 \times 2.4 = 360$ kg

各柱屋架重等计

C₁ 柱 $35.70 - 10.24 + 3.22 = 28.68 \text{ m}^2$
 $28.68 \times 0.38 = 10.88 \text{ t}$ — C₁

C₂ 柱 $35.70 - 16.06 + 3.22 = 22.86 \text{ m}^2$
 $22.86 \times 0.38 = 8.68 \text{ t}$ — C₂

C₃ 柱 $31.50 - 12.46 = 18.44 \text{ m}^2$
 外 $18.44 \times 0.38 = 7.12$
 内 $2.90 \times 0.358 = 1.03$
 7" $5.00 \times 0.300 = 1.50$ } — 9.65 t C₃

C₄ 柱 $31.50 - 13.54 + 6.96 = 24.62 \text{ m}^2$
 外 $24.62 \times 0.38 = 9.35$
 内 $5.50 \times 0.358 = 2.07$
 7" $5.00 \times 0.300 = 1.50$ } — 12.92 t C₄

C₅ 柱 $37.124 - 27.00 = 10.12$
 外 $10.12 \times 0.38 = 3.84$
 内 $5.74 \times 0.358 = 2.05$ } — 5.89 t C₅

C₆ 柱 $37.124 - 18.72 = 18.40 \text{ m}^2$
 外 $18.40 \times 0.38 = 6.99$
 内 $12.20 \times 0.358 = 4.36$ } — 11.35 t C₆

C₇ 柱 $25.432 - 14.31 = 11.12 \text{ m}^2$
 $11.12 \times 0.36 = 4.00 \text{ t}$ — C₇

C₈ 柱 $25.432 - 20.11 = 5.32 \text{ m}^2$
 $5.32 \times 0.36 = 1.91 \text{ t}$ — C₈

柱 1200 轴方向

C1 柱

构造柱	= 20.759 t
基础	= 3.456 t
地中柱 0.96×5.10	= 4.596 t
" $0.432 \times 2.2/2$	= 0.445 t
237 $0.528 \times 2.3 \times 3.3$	= 4.007 t
层 (别纸计算)	= 10.880
Σ	<u>44.47 t</u>

C2 柱

构造柱	= 20.260 t
基础	= 3.456 t
地中柱 0.96×5.10	= 4.596 t
" $0.432 \times 2.2/2$	= 0.445 t
237 $0.528 \times 2.3 \times 3.3$	= 4.007 t
层 (别纸计算)	= 8.680 t
Σ	<u>41.77 t</u>

C3 柱

构造柱	= 33.253 t
基础	= 6.144 t
地中柱 0.96×7.55	= 7.248 t
" 0.432×2.30	= 0.993 t
237 $0.528 \times 5 \times 3.3$	= 8.412 t
层 (别纸计算)	= 9.650 t
Σ	<u>66.00 t</u>

C4 柱

构造柱	= 29.793 t
基础	= 6.144 t
地中柱 0.96×4.15	= 7.248 t
" 0.432×2.30	= 0.993 t
237 $0.528 \times 5 \times 3.3$	= 8.412 t
层 (别纸计算)	= 12.920
Σ	<u>65.81 t</u>

C5 柱

构造柱	= 34.815 t
基础	= 8.704 t
地中柱 0.96×6.225	= 5.976 t
" 1.44×3.14	= 4.521 t
" 0.432×3.32	= 1.434 t
237 $0.528 \times 3.3 \times 2.4$	= 4.404 t
" $0.802 \times 3.47 \times 4.02$	= 11.187 t
层 (别纸计算)	= 5.890 t
次梁	= 0.670 t
Σ	<u>77.90 t</u>

C6 柱

构造柱	= 34.505 t
基础	= 8.704 t
地中柱 0.96×6.225	= 5.976 t
" 1.44×3.14	= 4.521 t
" 0.432×3.32	= 1.434 t
237 $0.528 \times 3.3 \times 2.4$	= 4.404 t
" $0.802 \times 3.47 \times 4.02$	= 11.187 t
层 (别纸计算)	= 11.350 t
Σ	<u>82.38 t</u>

C7柱

構造印 17.101 t
 基礎 3.456 t
 地中壁 $0.94 \times 6.94 = 6.523$ t
 " $0.432 \times 3.32 = 1.434$ t
 スラブ $0.802 \times 3.47 = 11.187$ t
 $\times 4.02$
 屋 (別紙計算) = 4.000 t
~~次.0.0~~ - 0.690 t

 44.370 t

C8柱

構造印 17.101
 基礎 3.456
 地中壁 $0.94 \times 6.94 = 6.523$
 " $0.432 \times 3.32 = 1.434$ t
 スラブ $0.802 \times 3.47 = 11.187$ t
 $\times 4.02$
 屋 (別紙計算) = 2.99 t

 = 42.691

軸力表

柱径 80 41.77 t	柱径 100 65.81 t	柱径 100 82.38 t	柱径 80 42.69 t
C2	C4	C6	C8
C1	C3	C5	C7
44.47 t 柱径 80	66.00 t 柱径 100	77.90 t 柱径 100	44.37 t 柱径 80

基礎板耐力算定

1) 至 600 迄 15m (4L 計)

$$R = \frac{1}{3} (15 \times 22 \times 0.783 + \frac{22 \times 5}{5} \times 1.88) \times 0.5 = 35.9 \text{ t}$$

2) 至 800 迄 15m (4L 計)

$$R = \frac{1}{3} (15 \times 22 \times 0.503 + \frac{22 \times 5}{5} \times 2.51) \times 0.5 = 59 \text{ t}$$

3) 至 1000 迄 15m (4L 計)

$$R = \frac{1}{3} (15 \times 22 \times 0.4755 + \frac{22 \times 5}{5} \times 3.14) \times 0.8 = 84.504 \text{ t}$$

各寸自重

1. 基礎

$$1.2 \times 1.2 \times 1.2 \times 2 = 3.456 \text{ t} / 4$$

$$1.6 \times 1.6 \times 1.2 \times 2 = 6.144 \text{ t} / 4$$

$$1.6 \times 1.6 \times 1.4 \times 2 = 8.904 \text{ t} / 4$$

2. 地中柱

$$0.40 \times 1.00 \times 2.4 = 0.96 \text{ t/m}$$

$$0.40 \times 1.50 \times 2.4 = 1.44 \text{ t/m}$$

$$0.30 \times 0.160 \times 2.4 = 0.622 \text{ t/m}$$

$$0.30 \times 0.110 \times 2.4 = 0.260 \text{ t/m}$$

3. 一階市路室在荷重

20mm 板	258
20mm 梁	60
柱	300
	(180)

三層計算用 = 698 kg/m²

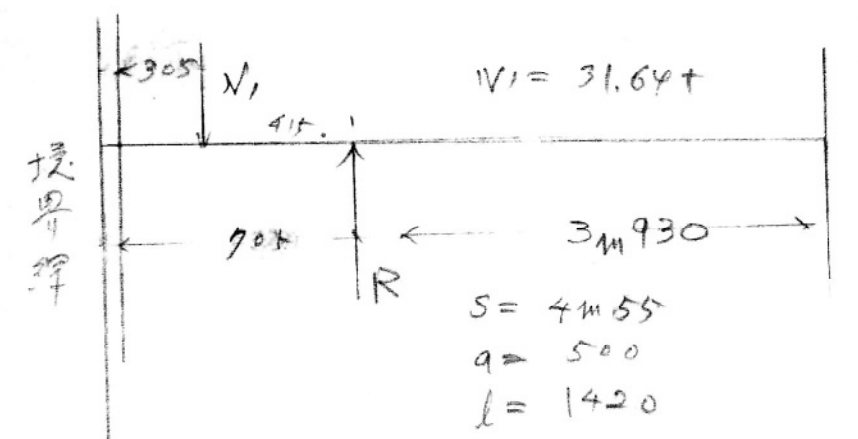
三層+二層計算用 = 528 kg/m²

基礎スラブの算定

	F ₁ F ₂	F ₃ F ₄	F ₆ F ₅	F ₇ F ₈	
l	1.42 x 1.42	1.75 x 2.00	1.75 x 2.00	1.55 x 1.60	
a	50	50	50 x 60 50 x 85	50 x 60	
b = a + 2D	1.42	1.75 x 2.00	1.75 x 2.00	1.55 x 1.60	
l/a	3.20	4.0	4.0 2.35	3.2 2.66	
N ₁	31.64	42.90	40.70 45.85	21.10 21.10	
D	80 (72)	80 (72)	80 (72)	80 (72)	
e	30	10	25 10	30 10	
e/l	0.211	0.058	0.142 0.058	0.129 0.066	
せん断力	Q _T /N ₁	0.47	0.29	0.372 0.216	0.355 0.282
	Q _F	14.87t	12.44	15.14 12.65	7.49 5.95
	τ	1.66	1.12	1.37 1.14	0.76 0.61
曲率	M _T /N ₁	0.30	0.22	0.31 0.170	0.24 0.17
	M _F	4.94	4.72	4.12 6.62	2.53 2.15
at	4.12 D13-200	4.62 D16-201	6.95 D16-200	6.46 D13-200	2.47 D13-200

$j' = 72 \times \frac{11}{8} = 63$
 $\tau = Q_T / b \times j'$
 $\varphi = Q_F / t a j'$
 $t = 21$
 $at = M_T / t j'$

F₃F_{3'} 基礎偏心算定

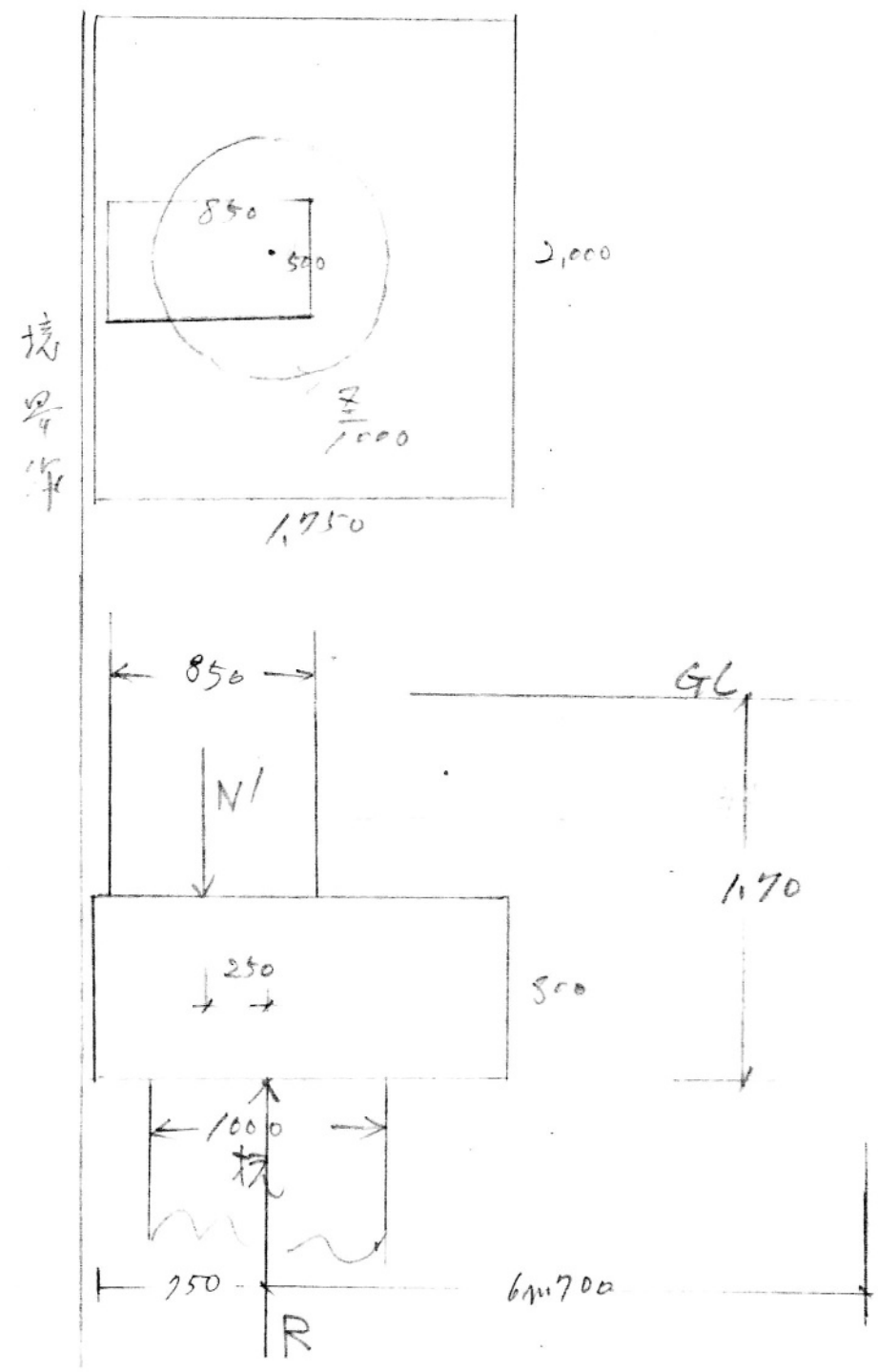


$R = \frac{455 - 305}{455 - 705} \times 31.64 = 34.17t$
 底面積 $3.14 \times 0.4^2 = 0.5024 m^2$
 $59t / 0.5024 = 117.4 t/m^2$
 最大曲げモーメントの位置 x
 $x = \frac{31.64}{117.4 \times 0.8} = 33.6 cm$
 基礎自重 $1.6 \times 1.42 \times 1.2 \times 2 = 5.45t$
 $G_{max} = \frac{31.64 + 5.45}{0.5024} = 73.8 < 117.4 t/m^2$
 $max M = 31.64 \times \left((0.336 - 0.305) - \frac{0.336^2}{2} \right)$
 $= 31.64 \times 0.137m = 4.33 t \cdot m$

せん断力
 $= 31.64 \times 0.4 = 12.656 t \cdot m$
 土中平均算定 12 t/m x 5 t/m 別紙

F ₄	せん断力	21.1 x 0.095 =	2.0 t
F _{4'}	せん断力	21.1 x 0.105 =	2.21 t
F _{2'}	"	42.9 x 0.105 =	4.50 t
F _{1'}	"	45.85 x 0.105 =	4.81 t

F1 基础 偏心 计算



$$N = 45.85 \text{ t} \quad S = 71.45$$

$$a = 55 \text{ cm}$$

$$L = 1.75 \text{ m}$$

$$R = \frac{7.450 - 425}{7.450 - 750} \times 45.85 = 47.71 \text{ t}$$

底面积 $3.14 \times 0.5^2 = 0.785 \text{ m}^2$

基础自重 $2.1 \times 1.75 \times 1.7 \times 2 = 11.90 \text{ t}$

$$G_{max} = \frac{47.71 + 11.9}{0.785} = 75.93 \text{ t} < 111.47 \frac{\text{t}}{\text{m}^2}$$

$$\frac{57.504}{0.785} =$$

最大弯矩 的位置

$$x = \frac{45.85}{111.47 \times 1 \text{ m}} = 0.411 \text{ m}$$

$$\text{max } M = 41.1 \text{ cm} - 45.0 = -3.9 \text{ cm}$$

$$= 45.85 \times \left(-0.039 - \frac{0.411}{2} \right)$$

$$= 45.85 \times 0.166 = 7.61 \text{ t m}$$

偏心 计算

- $M = 45.85 \times 0.10 = 4.585 \text{ t m} \quad C6$
- $M = 40.90 \times 0.30 = 12.21 \text{ t m} \quad C5$
- $M = 21.1 \times 0.30 = 6.33 \text{ t m} \quad C7$
- $M = 21.1 \times 0.10 = 2.11 \text{ t m} \quad C8$
- $M = 42.9 \times 0.1 = 4.29 \text{ t m} \quad C3C4$
- $M = 31.64 \times 0.30 = 9.492 \text{ t m} \quad C1C2$

ブロック壁基礎の算定

屋根荷重床荷重は「カテナバー」スラブが受けるものとしてスラブ算定

ブロック壁 1m 当り 軸力

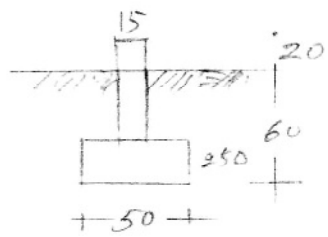
$$N = 3.75 \text{ m} \times 0.30 \text{ t} = 1.125 \text{ t/m}$$

$$N' \text{ 基礎自重 } 1 \times 0.5 \times 0.6 \times 2 = 0.6 \text{ t/m}$$

$$N \Sigma = 1.125 + 0.60 = 1.725 \text{ t/m}$$

地盤地耐力を 4 t/m^2 と仮定

$$1.725 < 4 \times 1 \times 0.5 = 2 \text{ t}$$



$$l/a = 50 / 15 = 3.33$$

$$\sigma_F / N' = 0.28$$

$$\sigma_F = 1.125 \times 0.28 = 0.315 \text{ t}$$

$$d = 22 \quad j = 19.2 \text{ cm}$$

$$\sigma_F = N' \times l \times 2 \text{ 算定}$$

$$z = 1.125 / 50 \times 19.2 = 1.17 \text{ kg/cm}^2$$

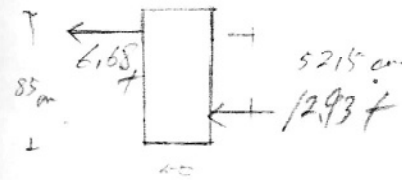
$$\phi = 1.175 / 1600 \times 19.2 = 3.66 \text{ cm} \quad \text{D10φ} - \text{@} 300$$

$$M/F / N' a = 0.15 \quad M/F = 0.025 \text{ t/m}$$

$$a/F = 2500 / 1600 \times 19.2 = 0.08 / \text{cm}^2$$

$$\text{D10φ} \text{ @ } 200$$

C5 柱のねじり算定



$$\text{ねじり } M = (12.99 - 6.63) \times 9.525 = 3.28 \text{ t/m}$$

$$a_{ie} = 38.70 \text{ cm}^2$$

$$a_{im} = 17.22 \text{ cm}^2$$

$\sigma = 24 - 1$ ねじり (ねじり面積)

$$a_{im}$$

$$= \frac{328000}{2 \times 2000 \times 3446} \times 20 = 0.47 \text{ cm}^2$$

$$1 - b_{13} = (a = 124 \text{ cm}^2)$$

$$a_{ie} = \frac{328000}{2 \times 2000 \times 3446} \times 15.5 = 0.36 \text{ cm}^2$$

$$1 - b_{13} = (a = 124 \text{ cm}^2)$$

閉鎖形の筋材の筋と (2) b 13φ の間隔又

$$x = \frac{2 \times 1600 \times 3446 \times 124}{328000} = 40 \text{ cm}$$

$$\text{筋材 } 15 \text{ cm} \text{ @ } \text{安全と存}$$

はりの設計用応力および断面算定 (×方向)

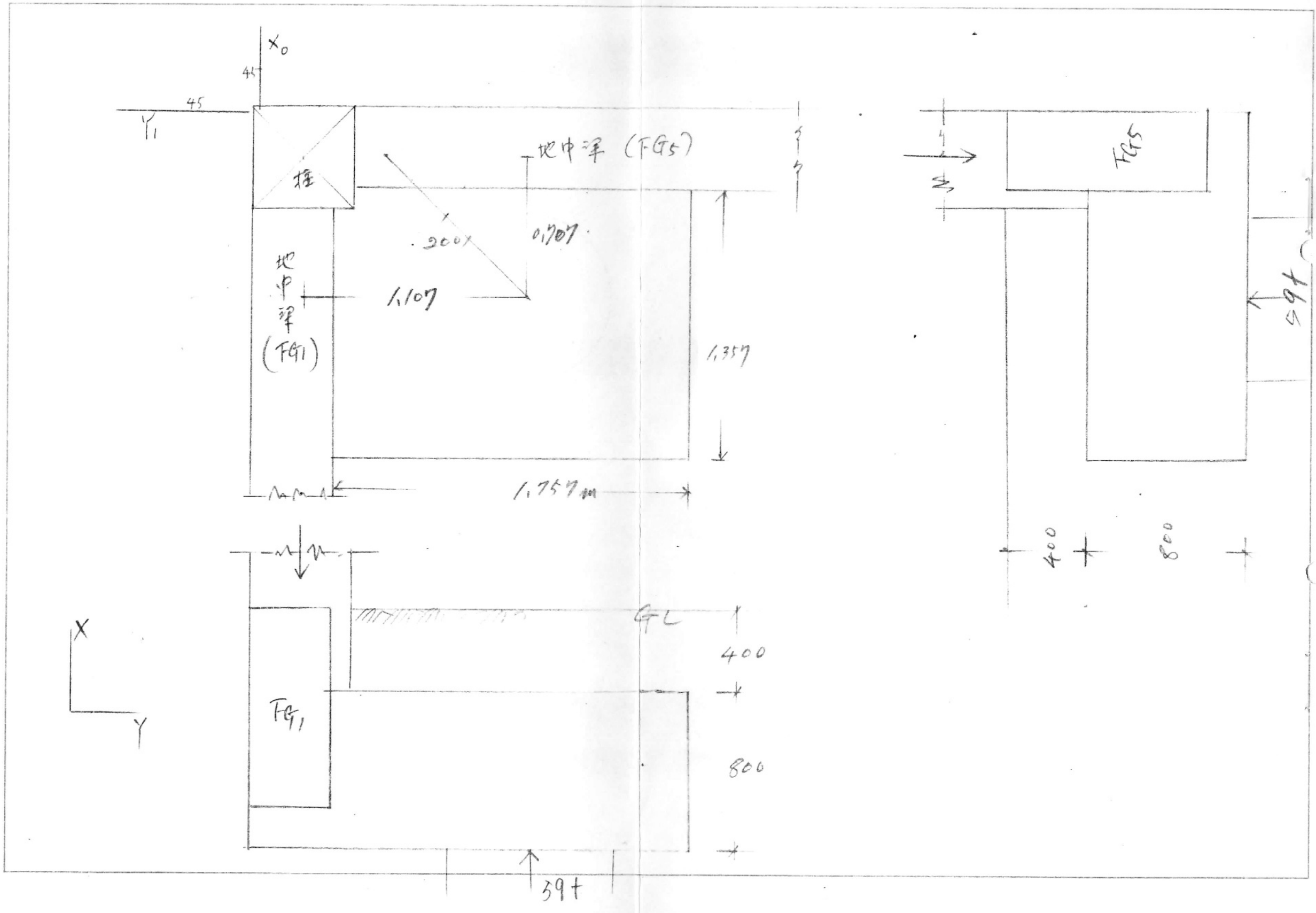
φ-D16Φ・●-D19Φ・○-D22Φ・◎-D25Φ・⊗-D29Φ

はり記号		2G2			RG9			RG10			↑7G×1×2			↑7G×0×1			↑7G×1×2			↑7G×0×1			
位置		端	中央	端	端	中央	端	端	中央	端	端	中央	端	端	中央	端	端	中央	端	端	中央	端	
長期	M(t.m)	11.34		0.02	9.97		4.37	10.10		4.36													
	Q(t)		0.22			10.79			10.73			3.97			3.09			4.93			10.71		
水平	M(t.m)	7.51		10.09	4.94		8.92	5.12		8.92													
	Q(t)	3.25				1.72			1.74														
短期	M(t.m)	8.86		10.11	14.91		13.29	15.22		13.28													
	Q(t)			(7.49)		(11.09)			(11.13)														
断面	b × D (cm)	30 × 60			35 × 75			35 × 75			30 × 50			30 × 50			30 × 50			30 × 80			
	d (cm)	55			70			70			45			45			45			55			
	j (cm)	1650			2450			2450			60450			60750			60750			90750			
	bd ² (×10 ⁶)	9.0750			171500			171500			60450			60750			60750			90750			
c	長				6.29			6.25			6.53			5.05			7.29			11.50			
	短	9.76		11.14	8.69		7.75	8.87		7.74													
p _r (%) (r)	上	0.36		0.42	0.32		0.24	0.33		0.29													
	下																						
a _r (cm ²)	上	5.44		6.93	7.84		5.88	8.09		7.10				0.36			0.28			0.40		0.66	
	下		3.30			8.575			8.575		4.86			3.75			5.40				1.89		
配筋		2-φ22		3-φ22	3-φ22		3-φ22	3-φ22		3-φ22	2-φ19		2-φ19	2-φ19		2-φ19	2-φ19		2-φ19	2-φ22		2-φ22	
			2-φ22			3-φ22			3-φ22			2-φ19			2-φ19			2-φ19			3-φ22		
v (cm)				21			21			21													
	Q/f _r j (cm)						8.6																
判定																							
	f _r bj 長(短)		ok		6×75×6/2 = 12.525		9×75×6/2 = 19.775		ok		ok			ok			ok			ok		ok	
M/Qd (短)																							
	α																						
α · f _r · bj (t)																							
a _r (cm)	上																						
	下																						
M _y (t.m)	上																						
	下																						
Σ M _y (t.m)																							
	l'(m) (Σ M _y /l')																						
ΔQ (t)																							
	ΔQ/bj																						
ρ _w (%)																							
	あばら筋	9φ-φ200			9φ@150			9φ@150			9φ@200			9φ@200			9φ@200			9φ@200		9φ@200	

構造計算書

1. 基礎柱中心間隔 $1m11 - (P2-P6)$

2. 基礎柱中心間隔 $1m30 - (P7-P11)$



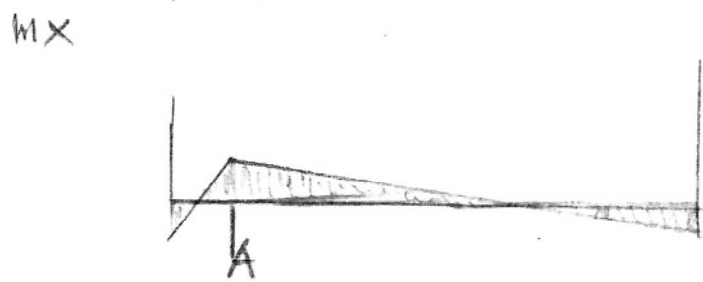
1) 柱の軸力 (C2)

柱の3カ所の構造部分	20,260t
壁	8,630t
237" 0.528 x 2.3 x 3.3	4,000t
地中壁 0.96 x 5.10	4,896t
" 0.432 x 2.2 / 2	0,475t
基礎 (前部)	3,456t
基礎 修正追加	3,525t
	Σ 45,300t

2) 柱の軸力が作用する地中半 m



$$M_B = 45.30 \times 1.107 \times 0.7 = 35.14 \text{ t}\cdot\text{m}$$



0.707

$$M_A = 45.35 \times 0.707 \times 0.5 = 16.00 \text{ t}\cdot\text{m}$$

3) 1"-2筋等寸

Y方向

$$M_Y = 35.14 \text{ t}\cdot\text{m}$$

$$\sigma_t = \frac{35.14}{2 \times 0.17 \times 0.875} = 28.7 \text{ cm}^2$$

$$Q = 45.35 \times 0.17 = 31.75 \text{ t} \quad \phi = \frac{31750}{21 \times 70 \times 0.875} = 25 \text{ cm}$$

(参考)

$$\tau = \frac{31750}{135 \times 70 \times 0.875} = 3.84 < 7 \text{ OK}$$

b=135
D=50

設計 8-D22 (30.96)

4) 1"-2筋等寸

X方向

$$M_X = 16.0 \text{ t}\cdot\text{m}$$

$$Q = 45.35 \times 0.15 = 22.68 \text{ t}$$

$$\sigma_t = \frac{16000}{2 \times 0.17 \times 0.875} = 13.05 \text{ cm}^2$$

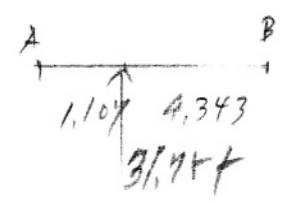
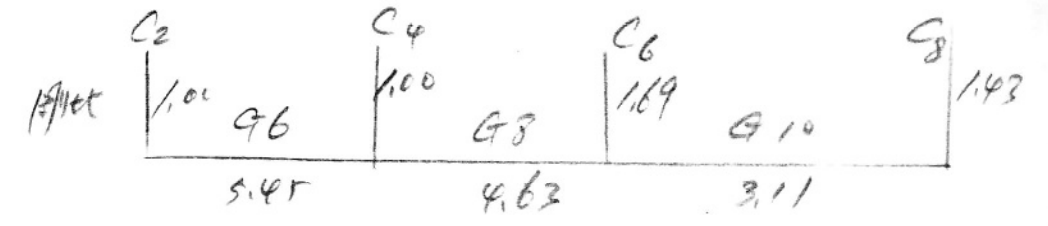
$$\phi = \frac{22.680}{21 \times 70 \times 0.875} = 17 \text{ cm}$$

b=176
D=50

$$\tau = \frac{22680}{176 \times 70 \times 0.875} = 2.1 < 7 \text{ OK}$$

設計 5-b22φ (19.35)

1) 地中平基法 Y方向 (FGS)

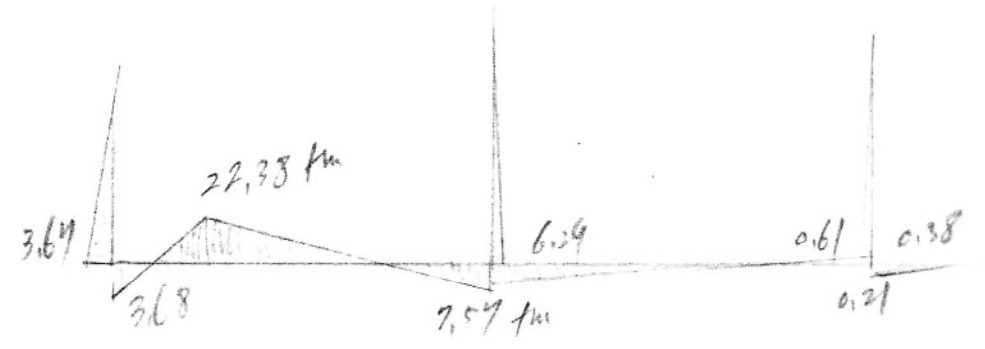


$$C_{AB} = 31.75 \times \frac{1.107 \times 4.343^2}{5.45^2} = 22.31 \text{ kN}$$

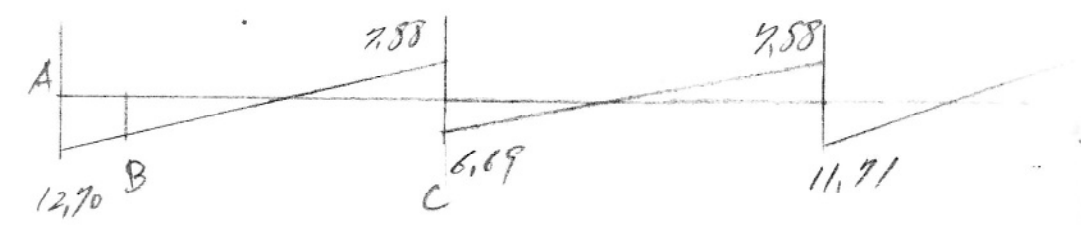
$$C_{BA} = 31.75 \times \frac{1.107^2 \times 4.343}{5.45^2} = 5.68 \text{ kN}$$

$$M_A = 31.75 \times \frac{1.107 \times 4.343}{5.45} = 28.0 \text{ kNm}$$

1.00	x	5.45	5.45	1.00	x	4.63	4.63	1.69	x	3.11
		-22.31	+5.68							
+3.45		+18.86	-2.91	-0.51		-2.36				
0		-1.45	+9.43	0		0	-1.18			
+0.22		+1.22	-4.63	-0.85		-3.93	+0.57	+0.21		+0.38
+3.67		-3.68	+7.57	-1.36		-6.29	-0.61	+0.21		+0.38



2) 水平荷载作用下的 M



$$M_B = 12.70 \times \frac{1.759}{3.029} = 7.37 \text{ kNm}$$

$$B \text{ 侧 } M = 7.37 + 22.38 = 29.75 \text{ kNm}$$

$$M = abd^2 = 2 \times 40 \times 95^2 = C \times 361000 \quad C = 8.24$$

$$pt = 0.3 \quad at = 95 \times 40 \times 0.3 = 1140 \text{ cm}^2 \quad \#5 \#10$$

$$C = 6.19 \quad pt = 0.34 \quad at = 95 \times 40 \times 0.34 = 1292 \text{ cm}^2 \quad \#7 \#11$$

4-D22 (15,480 cm²)

A 侧

$$M = 12.70 + 3.68 = 16.38 \text{ kNm}$$

$$C = 4.53 \quad pt = 0.2 \quad at = 95 \times 40 \times 0.2 = 760 \text{ cm}^2$$

2-D22 (7,740 cm²)

a 侧

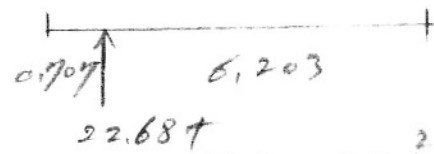
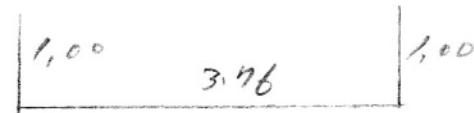
$$M = 7.14 + 7.58 = 14.72 \text{ kNm}$$

$$C = 4.29 \quad pt = 0.2 \quad at = 95 \times 40 \times 0.2 = 760 \text{ cm}^2$$

2-D22 (7,740 cm²)

2) 地中浮筒在 X 方向 (下)

1911t

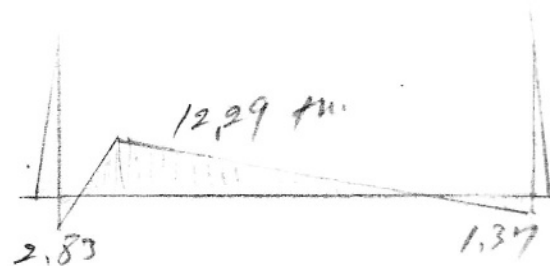


$$C_{AB} = 22.68 \times \frac{0.707 \times 6.203}{6.912} = 12.91 \text{ t}$$

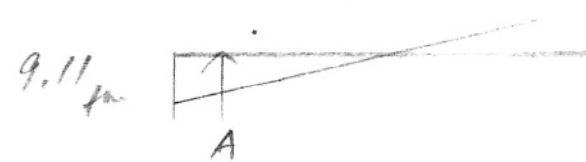
$$C_{BC} = 22.68 \times \frac{0.707^2 \times 6.203}{6.912} = 1.47 \text{ t}$$

$$M_0 = 22.68 \times \frac{0.707 \times 6.203}{6.91} = 14.39 \text{ t}$$

1.00	X	3.76	3.76	1.00	X
		-12.91	+1.47		
+2.71		+10.20	-1.17	-0.30	
0		-0.58	+5.10	0	
+0.12		+0.46	-4.03	-1.07	
+2.83		-2.83	+1.37	-1.37	



3) 水平荷重时的 M



$$M_A = 9.11 \times \frac{2.743}{3.450} = 7.24 \text{ t}$$

$$\Sigma M = 7.24 + 12.29 = 19.53 \text{ t}$$

$$M = ebd^2 = e \times 40 \times 95^2 = e \times 36100$$

$$C = 5.40 \quad p_t = 0.2 \text{ (左端)}$$

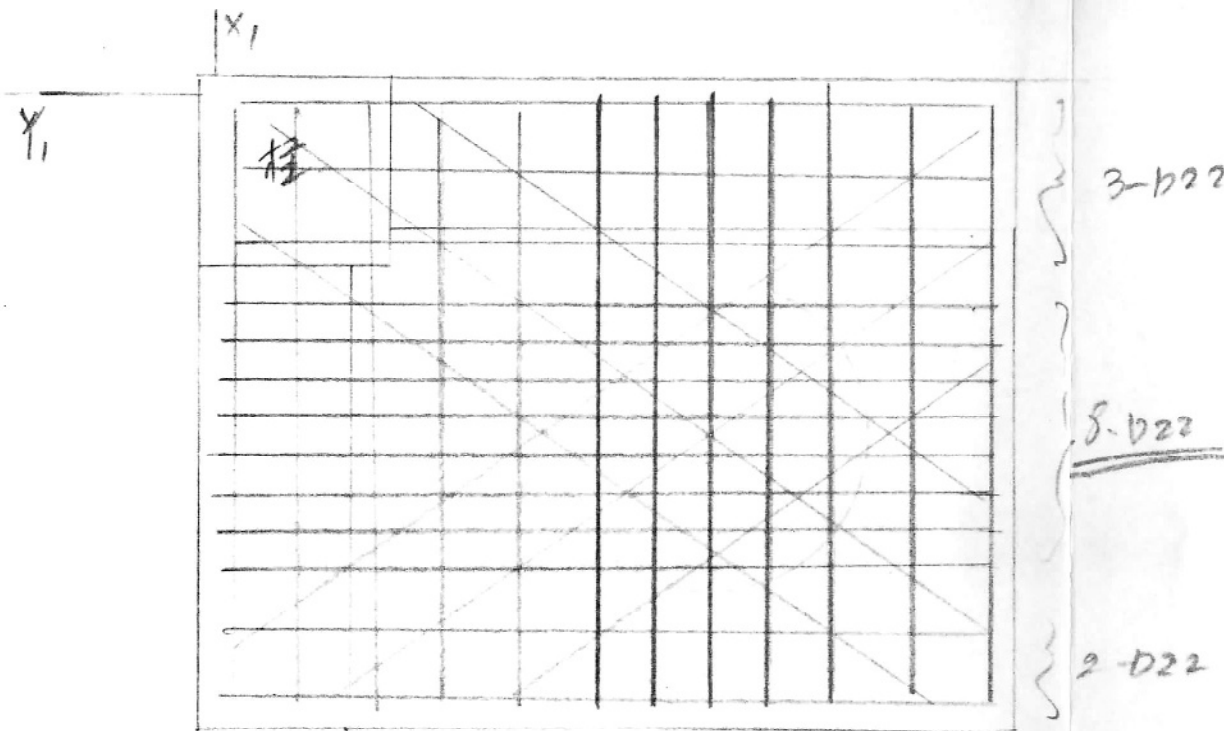
$$C = 3.40 \quad p_t = 0.2 \text{ (右端)}$$

$$a_t = 95 \times 40 \times 0.2 / 100 = 7.60 \text{ cm}^2$$

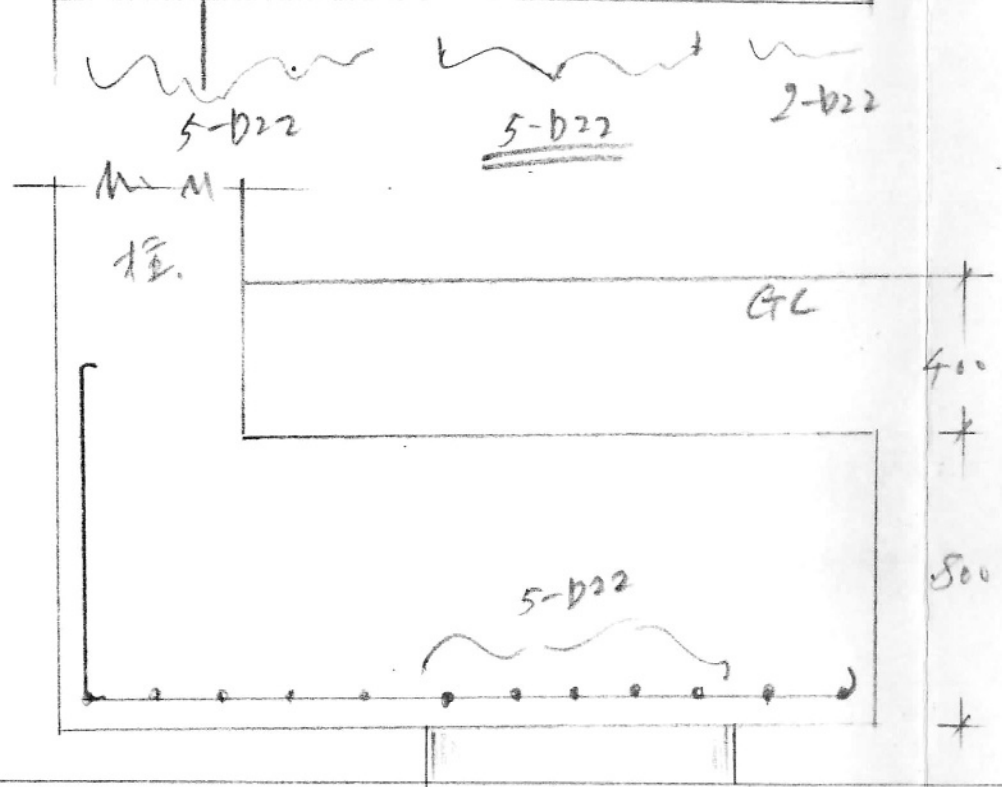
$$2 - 022 (7.74 \text{ cm}^2)$$

前设计用 77.

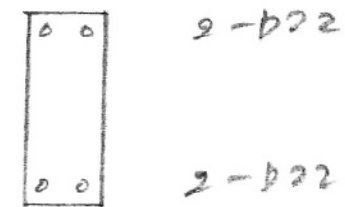
1) スラブ配筋



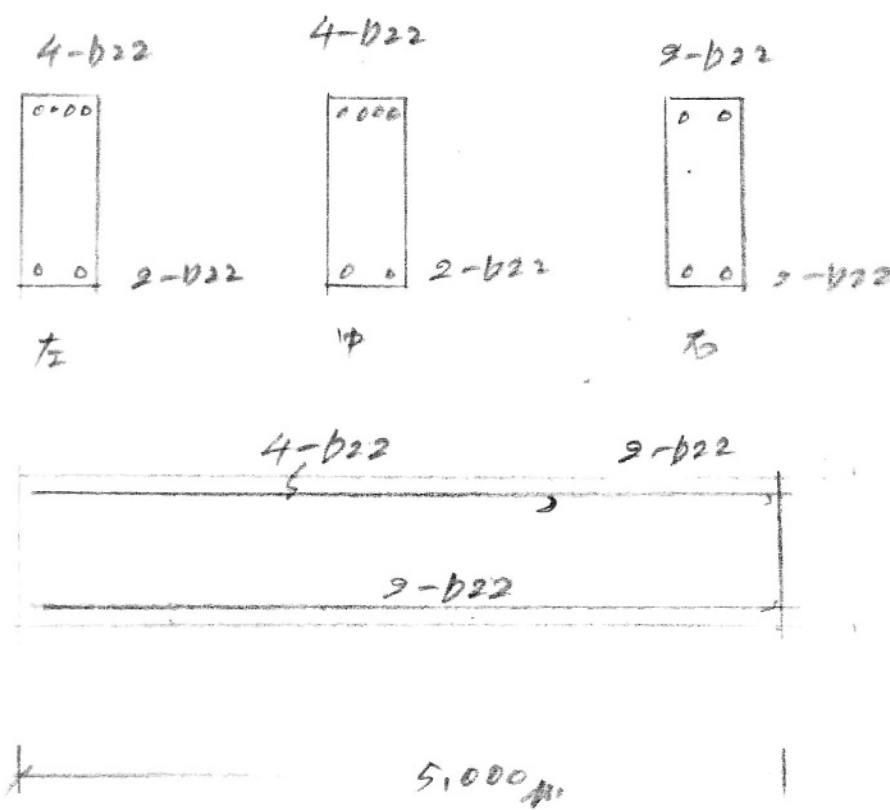
斜筋
3-b22
(=方向)

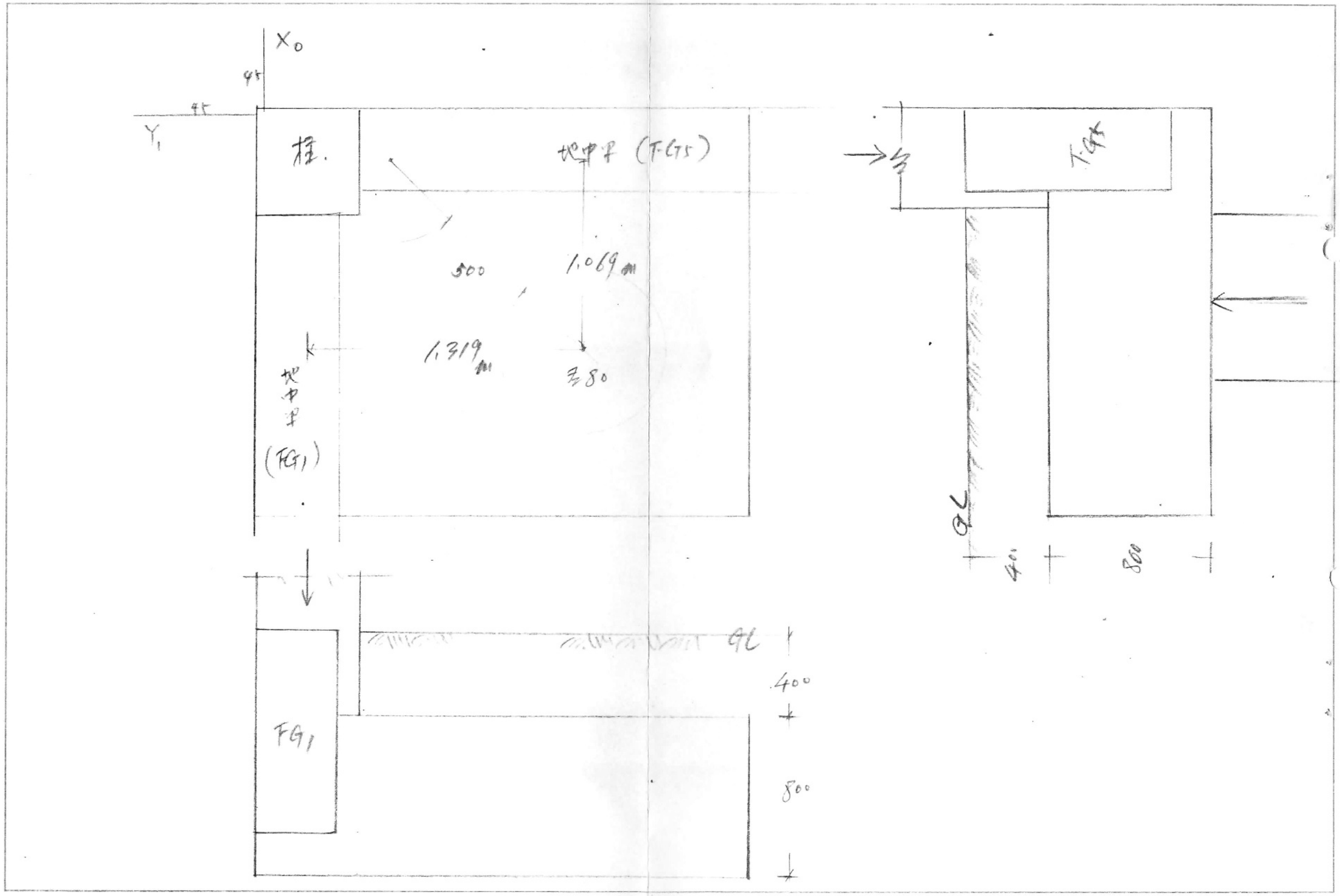


2) 地中梁 (FG1)



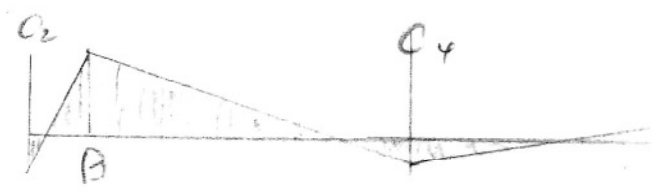
3) 地中梁 (FG5)





1) 柱の軸力が作用する地中系 m

M_y



$$M_B = 45.30 \times 1.319 \times 0.7 = 41.82 \text{ tm}$$



$$M_A = 45.30 \times 1.069 \times 0.50 = 24.21 \text{ tm}$$

2. 1-2 筋等定

Y 方向

$$M_y = 41.82 \text{ tm}$$

$$a_t = \frac{41.82}{2 \times 0.7 \times 0.845} = 34.13 \text{ cm}^2$$

$$Q = 45.30 \times 0.7 = 31.71 \text{ t}$$

$$q = \frac{31.71}{21 \times 70 \times 0.845} = 2.5 \text{ a}$$

$$b = 171$$

$$d = 80$$

$$T = \frac{31.71}{171 \times 70 \times 0.845} = 3.03 < 7 \text{ OK}$$

設計 9-D22 (34.83)

3. 1-2 筋等定 X 方向

$$M_x = 24.21 \text{ tm}$$

$$Q = 45.35 \times 0.5 = 22.68 \text{ t}$$

$$a_t = \frac{24.21}{2 \times 0.4 \times 0.845} = 19.76 \text{ cm}^2$$

$$q = \frac{22.68}{21 \times 70 \times 0.845} = 1.9 \text{ a}$$

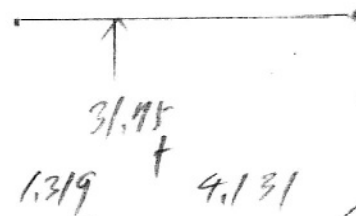
$$b = 196$$

$$d = 80$$

$$T = \frac{22.68}{196 \times 70 \times 0.845} = 1.8 < 7 \text{ OK}$$

設計 6-D22 (23.22)

1) 地中水平管生 (方向 FG5)

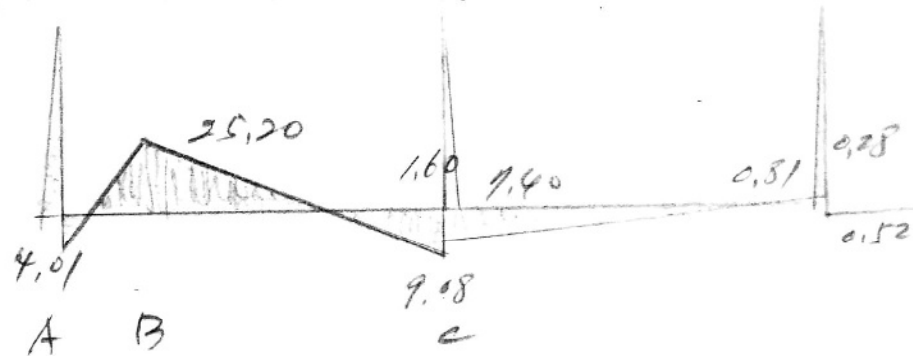


$$C_{AB} = 31.45 \times \frac{1.319 \times 4.131^2}{5.45^2} = 29.05 \text{ tm}$$

$$C_{BA} = 31.45 \times \frac{1.319^2 \times 4.131}{5.45^2} = 7.68 \text{ tm}$$

$$M_0 = 31.45 \times \frac{1.319 \times 4.131}{5.45} = 31.74 \text{ tm}$$

1.00	x	5.45	5.45	1.00	x	4.63	4.63	1.69	x	3.11
+3.72		-29.05	+7.68			-3.19				
0		+20.33	-3.77	-0.69		0	-1.59			
+0.29		-1.88	+0.16	0		-4.21	+0.78	+0.28		+0.52
		+1.58	-4.99	-0.91						
+4.01		-4.02	+9.08	-1.60		-7.40	-0.81	+0.28		+0.52



2) 水平管生は M 前同様

$$M_B = 25.20 + 7.37 \text{ tm} = 32.57 \text{ tm}$$

$$M = e b d^2 = c \times 361000$$

$$c = 9.02 \quad pt = 0.33 \text{ 超付}$$

$$c = 6.98 \quad pt = 0.35 \text{ 超付}$$

$$at = 95 \times 40 \times 0.38 / 100 = 14.44 \text{ cm}^2$$

$$4-D22 (15.48)$$

$$M_A = 4.01 + 12.70 = 16.71 \text{ tm}$$

$$c = 4.62 \quad pt = 0.2$$

$$at = 95 \times 40 \times 0.2 / 100 = 7.60 \text{ cm}^2$$

$$2-D22 (7.74 \text{ cm}^2)$$

$$M_C = 9.05 + 7.85 = 16.96 \text{ tm}$$

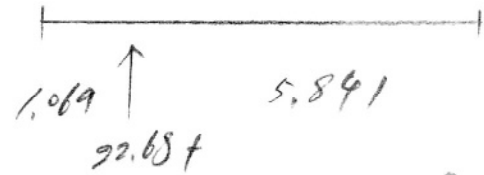
$$c = 4.69 \quad pt = 0.2$$

$$at = 95 \times 40 \times 0.2 = 7.60 \text{ cm}^2$$

$$2-D22 (7.74 \text{ cm}^2)$$

前同様

1) 水中浮筒造 × 19 (FG1)

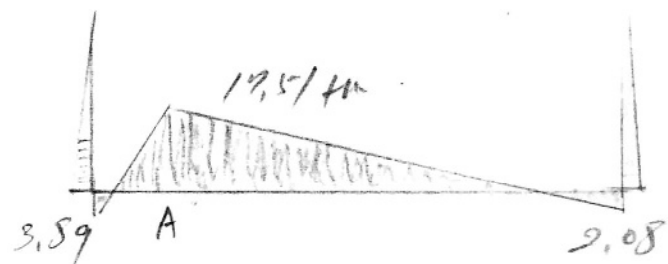


$$C_{AB} = 22.65 \times \frac{1.069 \times 5.841^2}{6.912} = 19.32 \text{ t}$$

$$C_{BA} = 22.65 \times \frac{1.069^2 \times 5.841}{6.912} = 3.16 \text{ t}$$

$$W_0 = 22.65 \times \frac{1.069 \times 5.841}{6.91} = 20.49 \text{ t}$$

1.00	x	3.76	3.76	1.00	x
		-19.32	+3.16		
+3.63		+13.69	-2.51	-0.65	
0		-1.25	+6.54	0	
+0.26		+0.99	-5.41	-1.43	
<hr/>					
+3.59		-3.59	+2.08	-2.08	



2) 水平桁架 前同様

$$M_A = 17.51 + 7.24 = 24.75 \text{ t}$$

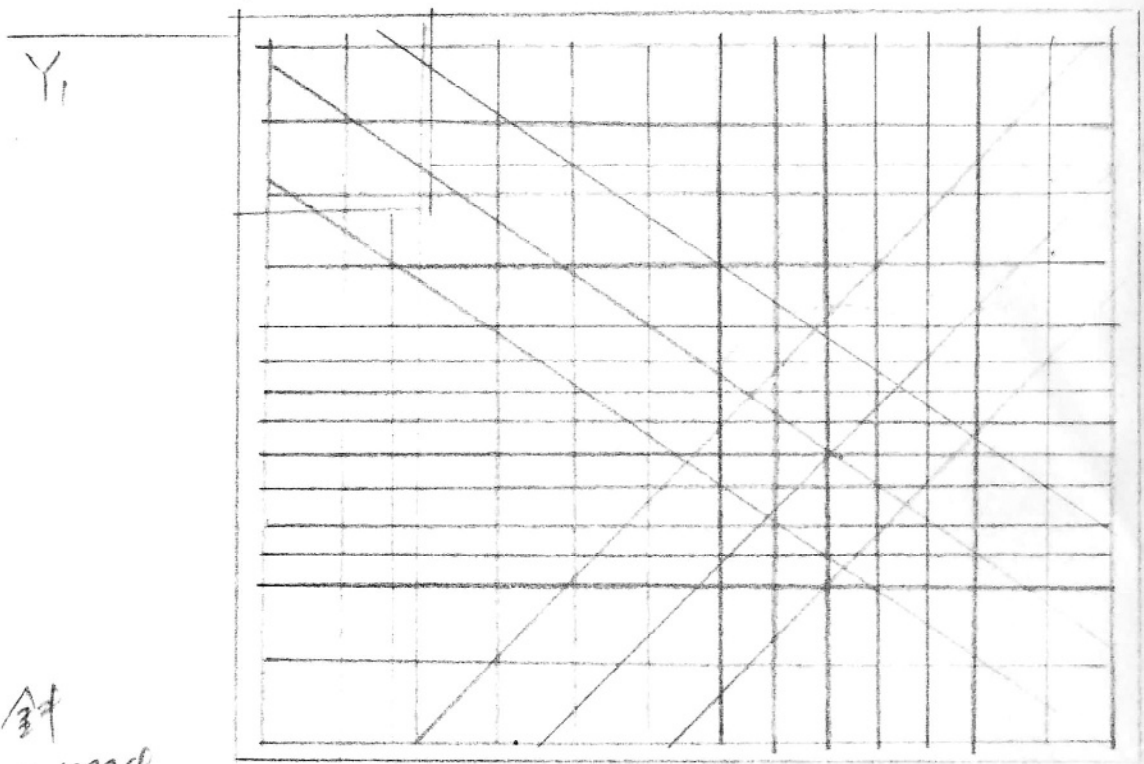
$$C = 6.35 \quad P_t = 0.24 \text{ 左側}$$

$$C = 4.85 \quad P_t = 0.24 \text{ 右側}$$

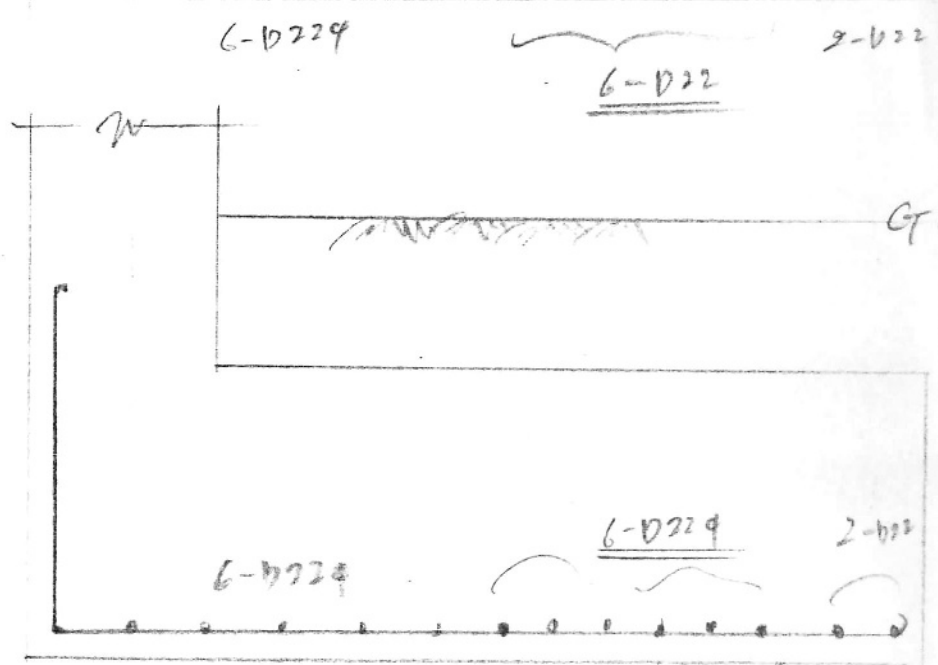
$$a_t = 45 \times 40 \times 0.24 / 100 = 9.12 \text{ m}^2$$

$$3-\text{D22} (11.61)$$

X0 1-2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

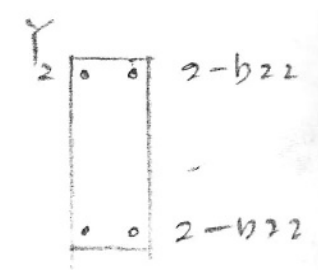
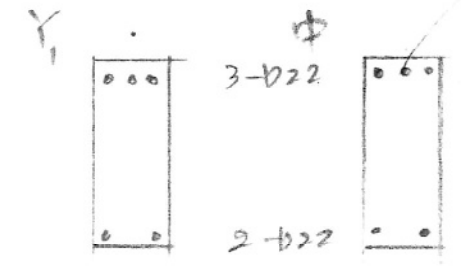


針
3-D22
2-D22



2) 地中井 (FG1)

中径 5m

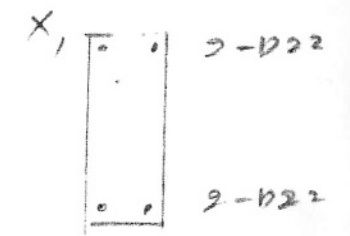
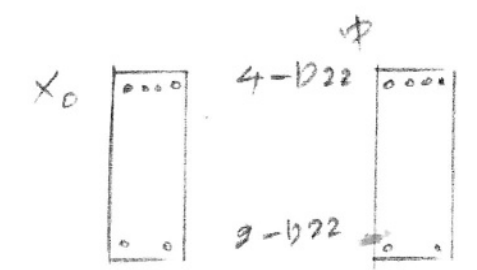


4-D22

9-D22

2-D22

3) 地中井 (FG5)



X0

X1