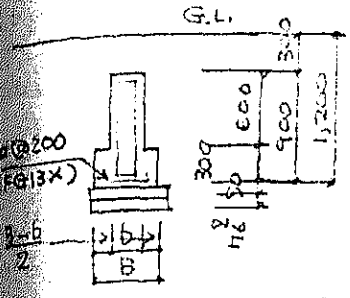
of Foundation Beam



	TOP R.	BTM R.	SIDE R.	STYP. TIE
b				
350	2-D19	2-D19	2-D10	□D10 ⌐D10 @200 @400
3 //	//	//	//	//
5 //	//	//	//	//

For Stress Between Piling Footing

$q = (FG35)\ 1.26 + (Brick\ Wainscot)\ 0.6 \times 2.9$
$= 3.0$ [t/m]

Span 4.5 [m]

Mo	$3.0 \times 4.5^2/8$	7.6 [tm]	at	5.4	[cm²]	) 2-D19
Q	$\times 4.5/2$	6.8 [t]	Q	6.4	[cm]	

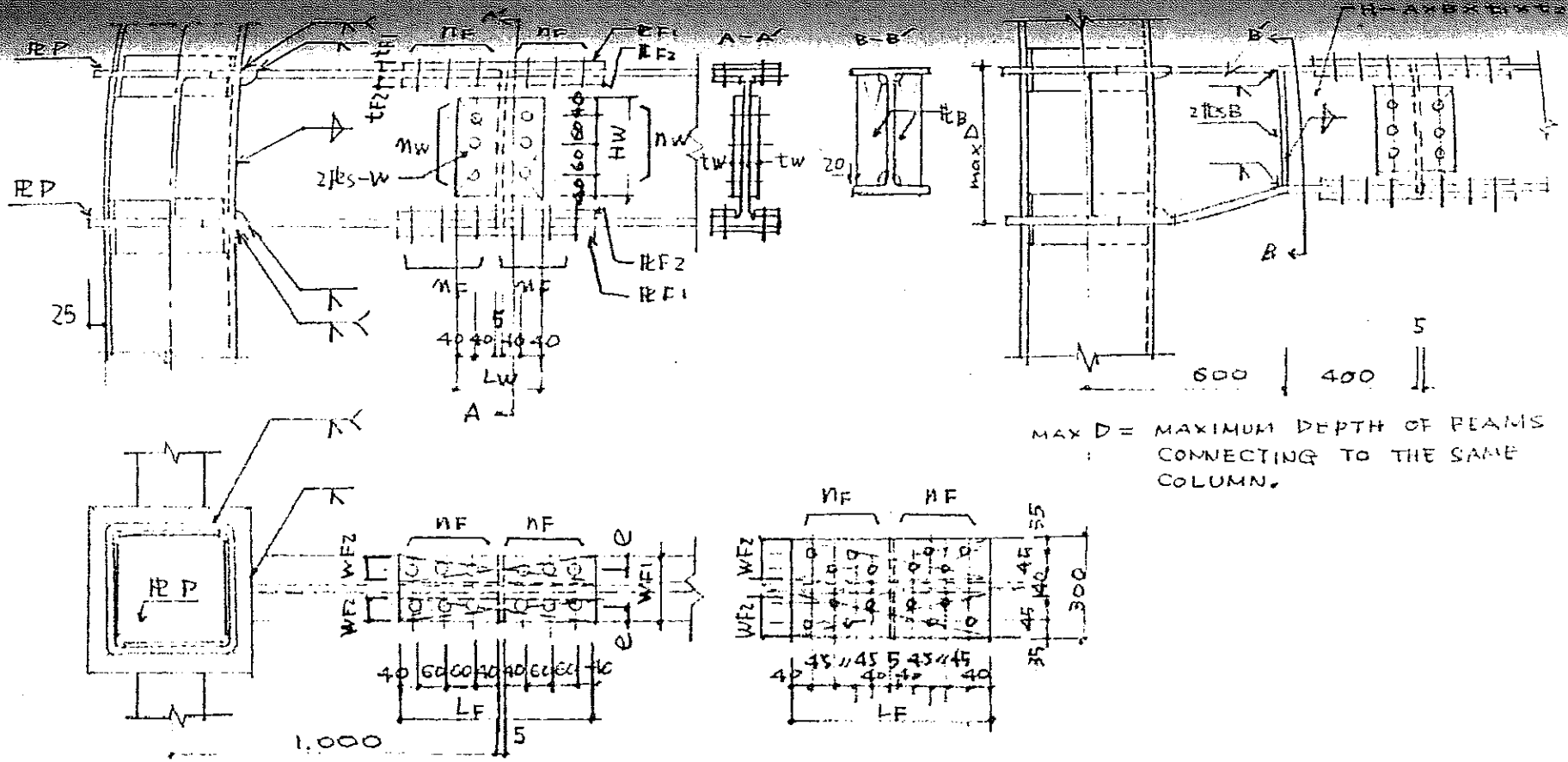
b 35 D 90 j 0.9 Q_{AL} 12.4 [t] > Q

$q = 1.26 + (0.6 \times 1.5) + (0.08 \times 8.5) = 2.84$

Span 5.3

Mo	$2.84 \times 5.3^2/8$	10.0	at	7.0	~ 3-D19
Q	$\times 5.3/2$	7.5			

			1.5	8.6	5.9	1.6	2.3	10.1	4.4	3.1	10.1	H 488×300×11×18											
4	M	CENT	3.6	1.9	4.8	6.3	5.4	5.5	1.2	2.7	5.5												
		①	5.6	4.8	6.5	11.1	9.4	10.4	12.1	16.7	16.7		530	7.97	66.5	7.20	1.00	1.60	2.910	0.24	G5		
		Q	3.1	1.3	-4.1 -4.1	-7.9 -9.3	4.7	4.4	1.0	2.1	4.7												
	M																						
		Q																					
	M	©										H 488×300×11×18											
		CENT	7.5	0	11.6	11.6	11.3	7.5	4.1	4.1	11.3												
1		⑧	8.9	9.7	27.8	0.4	13.4	18.6	18.9	9.3	18.9		400	7.97	50.2	7.20	1.00	1.60	2.910	0.27	G5		
		Q	1.4	4.9	-9.2	-5.0	2.1	6.3	7.8	3.6	7.8												
	M	⑧	11.0	3.4	13.9	21.7	16.5	14.4	2.9	10.7	16.5	H 488×300×11×18											
		CENT	9.3	4.0	9.0	20.4	14.0	13.3	0.3	11.1	14.0												
		⑧	7.2	11.3	31.6	1.0	10.8	18.5	24.4	8.2	24.4		390	7.97	48.9	7.20	1.00	1.60	2.910	0.35	G5		
		Q	5.4	4.3	-6.3 -9.17	-10.0 -6.0	8.1	6.7	4.3	4.6	8.1												



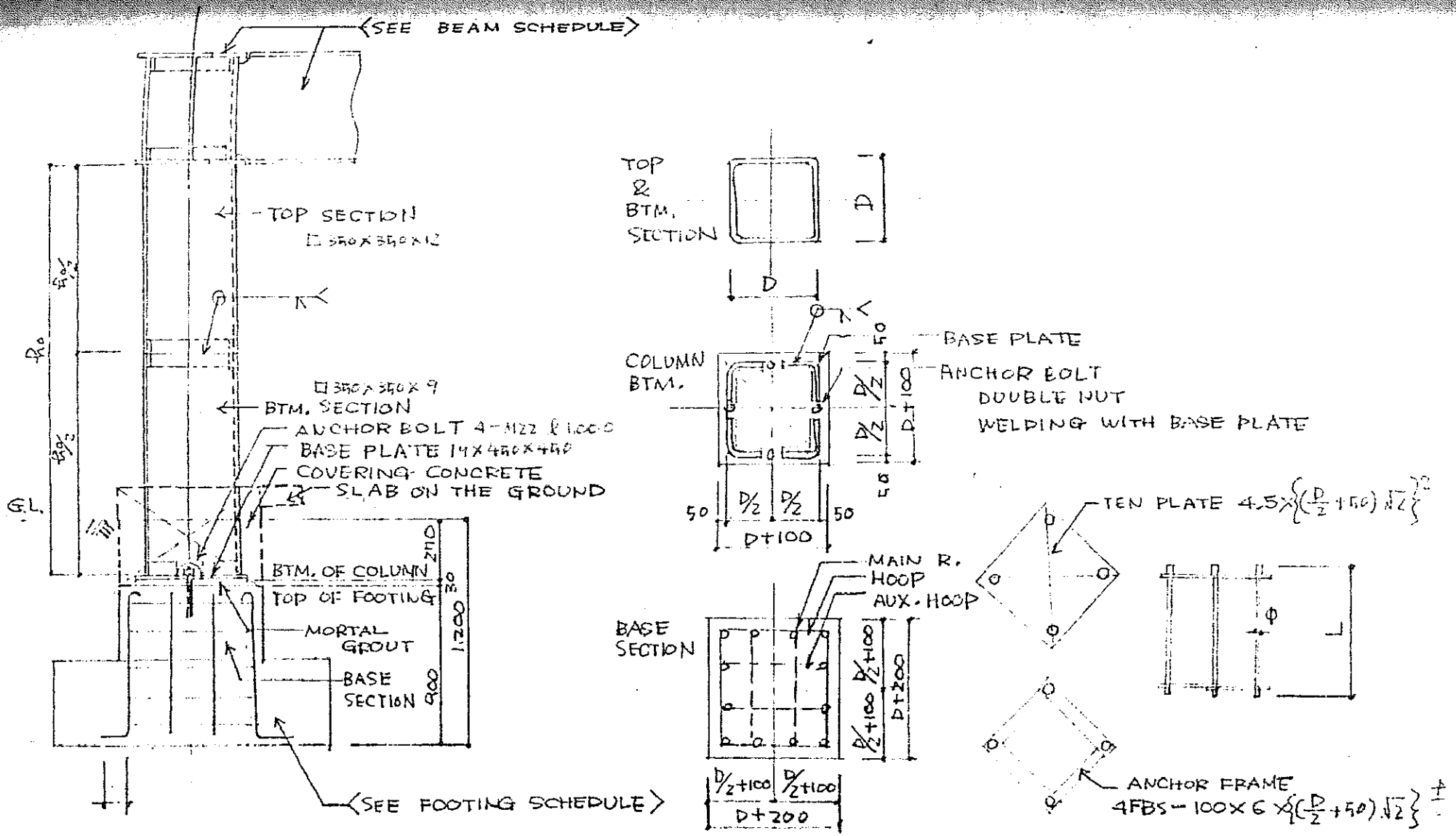
MAX D = MAXIMUM DEPTH OF BEAMS CONNECTING TO THE SAME COLUMN.

WF	e
150	30
175	30
200	35
250	45

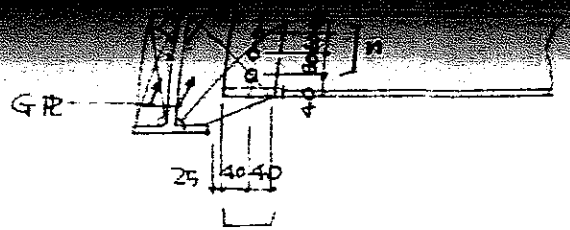
$$t_d \geq \sqrt{3}\,\frac{t_F}{f_d}$$

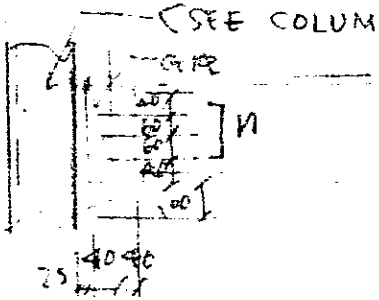
G9	H 900×300×16×28	28						
G8	H 800×300×14×26	28	16	19 × 300 × 615	22 × 107 × 615	2×6-M22	12 × 165 × 620	10 - M22
G7	H 700×300×13×24	25	16	19 × 300 × 525	19 × 107 × 525	2×5-M22	9 × 165 × 560	9 - M22
G6	H 588×300×12×20	22	16	16 × 300 × 435	16 × 107 × 435	2×4-M22	9 × 165 × 440	7 - M22
G6A	H 600×200×11×17	19	16	16 × 200 × 405	16 × 73 × 405	2×3-M22	9 × 165 × 440	7 - M22
G5	H-482×300×11×15	16	16					
G5A	H 500×200×10×16	16	16	12 × 200 × 405	16 × 73 × 405	2×3-M22	9 × 165 × 380	6-M22
G4	H 390×300×10×16	16	16					
G4A	H 400×200×8×13	16	16	9 × 200 × 285	12 × 73 × 285	2×2-M22	9 × 165 × 260	4 - M22

			N	10.2	1.3	-4.1	-2.9	19.3	11.5	6.1	7.3	16.3	□				
D①	←	M	U	1.5	8.6	-5.9	1.6	2.3	10.1	4.4	3.1	10.1	350×350×12	Cf.	Chart		
		M	L														
		Q		0.2	1.2	-2.2	1.2	0.3	1.4	2.0	1.4	2.0					
	↓	N															
		M	U														
		M	L														
		Q															
	←	N															
		M	U														
		M	L														
		Q															
	↓	N															
		M	U														
		M	L														
		Q															
B②	←	N		13.8	0.4	8.9	/	20.7	14.2	22.7	/	22.7	□			OK	C12
		M	U	0.2	9.5	5.4	/	0.3	9.7	5.6	/	9.7	350×350×12				
		M	L														
		Q		0.1	1.3	0.8	/	0.2	1.4	0.9	–	1.4					
	↓	N		13.8	3.6	-15.5	-15.0	20.7	15.4	1.7	1.2	20.7					
		M	U	2.1	13.1	15.9	-22.1	3.2	15.2	18.0	20.0	20.0					
		M	L														
		Q		0.3	1.8	2.2	-3.0	0.5	2.1	3.5	1.7	2.5					
A②	←	N		13.0	0.4	8.9	/	19.5	13.4	21.9	–	21.9	□			OK	C12
		M	U	0.2	9.5	5.4	/	8.3	9.7	5.6	/	9.7	350×350×12				
		M	L														
		Q		0.1	1.3	0.8	/	0.2	1.4	0.9	/	1.4					
	↓	N		13.0	1.3	-17.5	-13.8	19.5	14.3	4.5	0.8	19.5					
		M	U	3.1	11.3	-19.9	12.7	4.7	14.4	16.8	15.8	16.8					
		M	L														
		Q		0.4	1.5	-2.77	1.7	0.6	1.9	2.3	2.1	2.3					


〈SEE BEAM SCHEDULE〉
TOP SECTION
□ 350×350×12
□ 350×350×9
BTM. SECTION
ANCHOR BOLT 4-M22 ℓ 1000
BASE PLATE 14×450×450
COVERING CONCRETE
SLAB ON THE GROUND
G.L.
BTM. OF COLUMN
TOP OF FOOTING
MORTAL GROUT
BASE SECTION
〈SEE FOOTING SCHEDULE〉
TOP & BTM. SECTION
D
COLUMN BTM.
BASE PLATE
ANCHOR BOLT
DOUBLE NUT
WELDING WITH BASE PLATE
D/2+100
D+100
BASE SECTION
MAIN R.
HOOP
AUX. HOOP
D+200
TEN PLATE 4.5×{(D/2+50)√2}
ANCHOR FRAME
4FBS-100×6×{(D/2+50)√2}

[illegible]	[illegible]	[illegible]	D.L.	W.L.	T.L.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Member	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	C	[illegible]	[illegible]	Type
9.3	3.53	4.00	0.02	0.8x0.18	0.124	0.446	0.69	0.79	365	28.8	H-200x100	1.840	184	353	2.60	135.8	6.49	1.00	0.80	0.31	B2
3.3	4.00	1.25	〃	1.6x0.12	0.172	0.165	0.33	0.35			〃										〃
7.2	10.6	2.25	〃	1.6x0.16	0.236	0.481	6.76	2.39	10,656	281.5	H-300x[illegible]	13.600	508	530	4.58	115.7	8.33	1.55	1.25	0.47	B4A
〃	〃	3.80	〃	0.8x0.16	0.108	0.360	5.06	1.91	7.976	208	〃		〃								〃
3.3	5.3	11.5/5	0.51			1.22 (S.L. 0.85)			2984.3	267.7	H-250x125	4.050	324	530	3.26	162.5	7.74	1.00	0.80		F2A

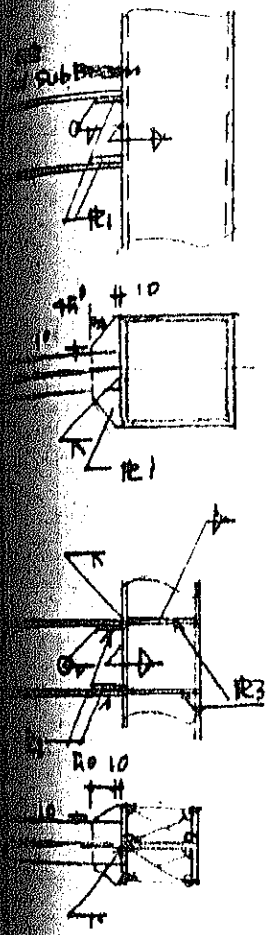




B4	H-400×200×8×13	4	4-M22
B3A	H-350×175×7×11	〃	〃
B3	H-300×150×6.5×9	〃	3-M22
B2A	H-250×125×6×9	9	〃
B2	H-200×100×5.5×8	〃	2-M22
B9	H-900×300×16×43	19	12-M22
B6A	H-588×300×12×20	16	17-M22
B6	H-600×200×11×17	〃	〃
B5	H-500×200×10×16	12	6-M22
B3E	H-350×350×12×19	12	2×3-M22

h	ℓ	@	w D.L.	w W.L.	w T.L.	P (S.L 0.05)	M_x	@	I_x	Z_x	Member	J	Z	R_b	i_b	λ_b	M_r	C	F_b	b/f	Type
7.0	1.5	10.6	0.02	1.6X0.16	0.236	6.23	9.35	6.23	5562.5	389.6	H-350x175	13,600	774	150	4.58	32.8	8.33	1.75	1.60	0.50	cG3A

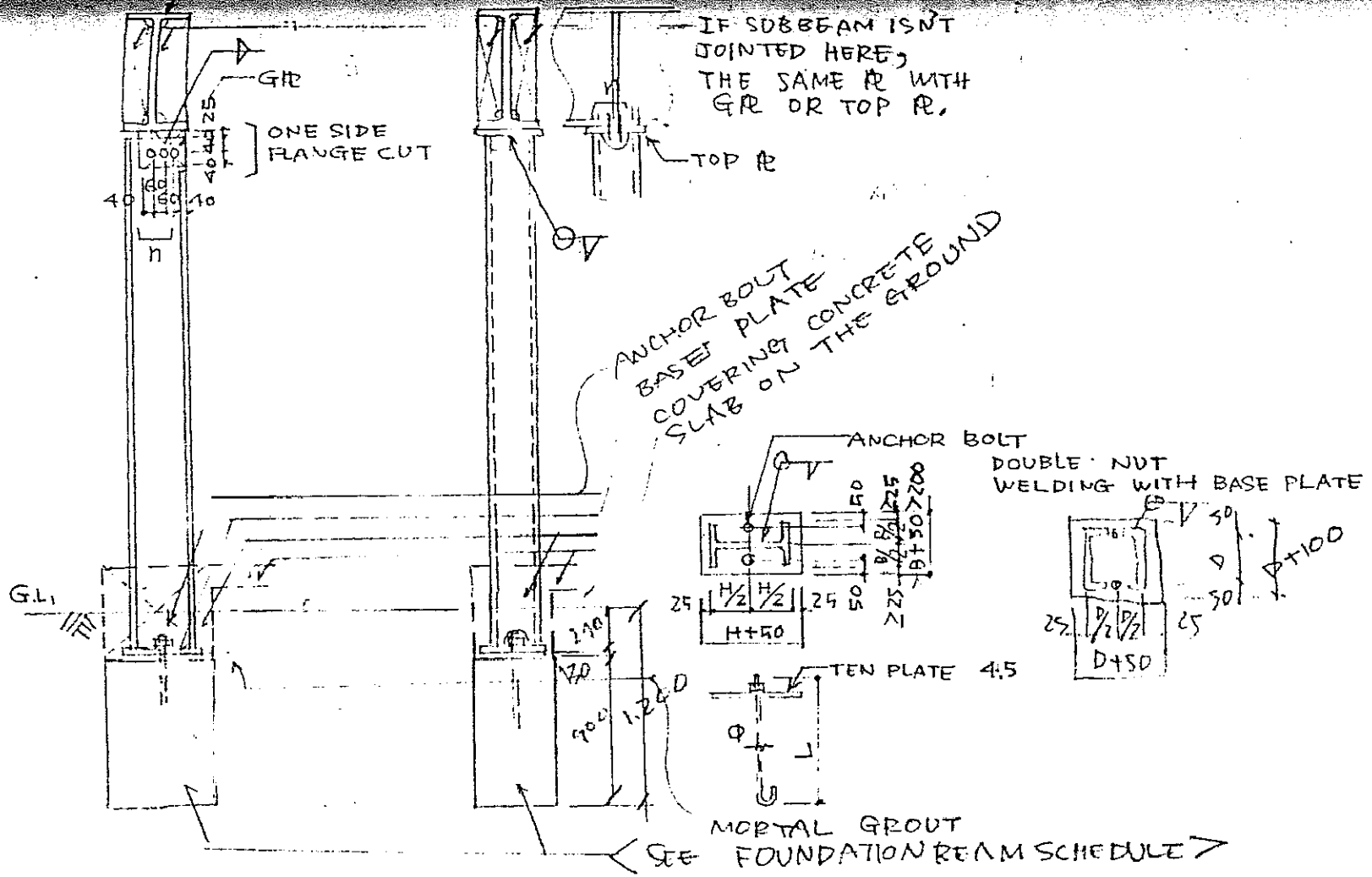
OF CANTILEVER



MARK	MEMBER	PL1	PL2	PL3
CG4	H-400×200×8×13	PL12	PL12	PL12
CG3A	H-350×175×7×11	〃	〃	〃
CG3	H-300×150×6.5×9	PL9	PL9	PL9
CG2	H-200×100×5.5×8	〃	〃	〃

DESIGN of POST

BTM	TOP	H	ⓗ	D.L. ω	D.L. g	N	W.L. ω	W.L. g	M	Q	Jx	Zx	Member	J	ℓk / ℓb	ik / ib	λk / λb	η / C	fc / fb	A / Z	σ/f	Type
7.2	9.3	2.1	3.53	0.05	0.23 (S.L. 0.05)	0.48	0.8x0.18	0.51	0.32	0.54	87.9	13.3	H-100x100	383	76.5							P1
0.3	7.0	6.7	3.8	0.02	0.13	0.84	0.8x0.12	0.36	2.05	1.21	2,040.9	85.4	H-300x150	7,210	690							P3


IF SDBBEAM ISNT
JOINTED HERE,
THE SAME AR WITH
GR OR TOP AR.
GR
TOP AR
ONE SIDE
FLANGE CUT
ANCHOR BOLT
BASE PLATE
COVERING CONCRETE
SLAB ON THE GROUND
ANCHOR BOLT
DOUBLE NUT
WELDING WITH BASE PLATE
TEN PLATE 4.5
G.L.
MORTAL GROUT
SEE FOUNDATION BEAM SCHEDULE

P2	H-200×100×5.5×8	DO	〃	座 〃 × 250 × 200	2-M 〃 × 〃	
P2A	H-250×125×6.5×9	DO	3-M22	座 〃 × 300 × 200	2-M 〃 × 〃	
P3	H-300×150×6.5×9	DO	〃	座 〃 × 350 × 200	2-M 〃 × 〃	
P3A	H-350×175×7×11	座12	4-M22	座 〃 × 400 × 225	2-M 〃 × 〃	
P4	H-400×200×8×13	DO	〃	座 〃 × 450 × 250	2-M 〃 × 〃	
P4A	H-450×200×9×14	DO	5-M22	座 〃 × 500 × 250	2-M 〃 × 〃	
P25	H-250×250×9×14	座9	2×2-M22	座19 × 300 × 300	〃	
P20A	□-200×200×8	TOP座 16×300×300	〃	座16 × 250 × 300	〃	
P25A	□-250×250×8	〃 19×350×350	〃	座19×300×350	〃	

Bracing

ฐ 6.93

@ 3.85

qA $0.8 \times 0.12 \times 3.85 = 0.37$

Q $0.37 \times 6.93/2 = 1.28$

D $1.28 \times 6.54/5.30 = 1.58 \sim \times 1 = 1.58$, $A_n = 1.58/2.4 = 0.7$

$$J_n = \frac{13 \times 0.0002 \times 654^3 \times 300}{384 \times 2,100} = 270.6$$

$$z_n = \frac{3 \times 0.02 \times 6.54^2 \times 100}{8 \times 2.4} = 13.4$$

L-130×130×9

A 22.7 , J 366.0 , Z 38.7

$$J_n' = \frac{5 \times 0.0002 \times 327^3 \times 300}{384 \times 2,100} = 13.0$$

$$z_n' = \frac{0.02 \times 3.27^2 \times 100}{8 \times 2.4} = 1.1$$

L-75×75×6

A 8.7 , J 46.1 , Z 8.5

Monitor Roof

Vertical

P $1/2 \times 0.18 \times 10.6 \times 2.1/2 = 2.80$

D $2.80 \times 4.52/4.00 = 3.17$ An $3.17/2.4 = 1.32$

4.00

10.60

L-75×75×6

Horizontal

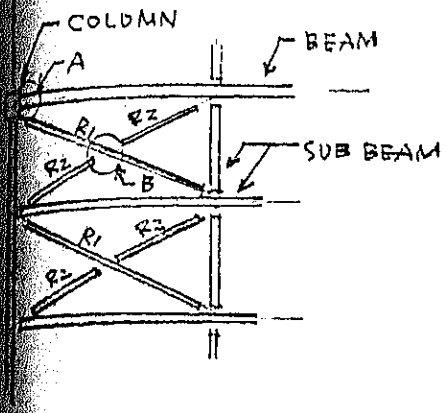
10.6

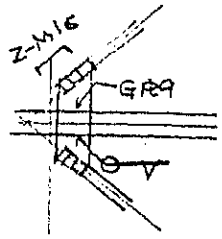
$$J_n = \frac{13 \times 0.0002 \times 534^3 \times 300}{384 \times 2,100} = 147.3$$

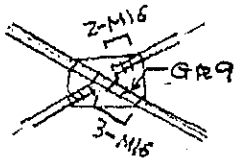
L-100×100×10

A 19.0, J 175.0, Z 24.4

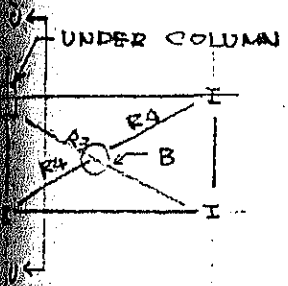
⑧ SCHEDULE

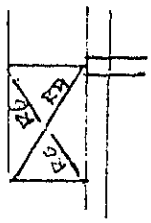






MONITOR ROOF





Mark	Member	Note
R1	L-130×130×9	At. Paint & Body F. ~ L-130×130×12
2	L-75×75×6	
3	L-100×100×10	
4	L-65×65×6	
5	〃	
6	〃	

ign of Shell Type Roof

Bldg.	Roof Level [m]	$q = 60\sqrt{h}$	C	Cq [kg/m²]
wy Repair ctory	10.5 ~ 13.0	194 ~ 216	1.6	310 ~ 346
ks ivage	7.0 ~ 9.5	158 ~ 185	〃	253 ~ 296
pection ctory	〃		〃	
rodical ry F,	〃		〃	
nt & Body ctory	〃		〃	
reading M.C. F.	〃		〃	

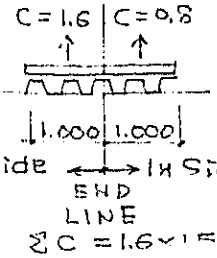
ntinuous Beam Type

$$\frac{M}{Z} = \frac{wl^2}{8Z} \le f \quad \sim \quad l_z \le \sqrt{\frac{8Zf}{w}}$$

$$\frac{5\,wl^4}{384\,EI} \le \frac{l}{300} \quad \sim \quad l_I \ge \sqrt[3]{\frac{384\times 2{,}100\,I}{300\times 5\,w}}$$

S-60 0.8 Mx1 Use Z 61.33 [cm³/m]
I 619.94 [cm⁴/m]
Self-w 13.5 [kg/m²]

w	Net w	l_z	l_I	l_{min}
0.346 [t/m²]	0.00492 [t/cm²]	373.6 [cm]	407.6 [cm]	373.6 [cm]
0.310	0.00438	396.0	423.8	396.0
0.296	0.00417	405.9	430.7	405.9
0.253	0.00353	441.1	455.3	441.1



$$l_z \le \sqrt{\frac{8\times 61.33\times 1.4}{w}} = \sqrt{\frac{686{,}896}{w}}$$

$$l_I \le \sqrt[3]{\frac{384\times 2{,}100\times 619.94}{300\times 5\times w}} = \sqrt[3]{\frac{333{,}279{,}744}{w}}$$

owable Span [cm]

	M.I. Roof	Roof
H.R. Factory	370	390
Generally	400	440

Cantilever Type

$$\frac{M}{Z} = \frac{w l^2}{2Z} \leq f \quad \sim \quad l_Z \leq \sqrt{\frac{2Zf}{w}}$$

$$\frac{w l^4}{8EI} \leq \frac{l}{250} \quad \sim \quad l_I \leq \sqrt[3]{\frac{8 \times 2{,}100\, I}{250\, w}}$$

w	Net w	l_Z	l_I	l_{min}
0.348 [t/m]	0.00333 [t/cm]	196.7 [cm]	210.9 [cm]	196.7 [cm]
0.310	0.00297	208.2	219.1	208.2
0.295	0.00283	213.3	222.7	213.3
0.253	0.00240	231.7	235.2	231.7

$$l_Z \leq \sqrt{\frac{2 \times 61.33 \times 0.75^{*} \times 1.4}{w}} = \sqrt{\frac{128.793}{w}}$$

$$l_I \leq \sqrt[3]{\frac{8 \times 2{,}100 \times 619.94 \times 0.75^{*}}{250\, w}} = \sqrt[3]{\frac{31{,}244.976}{w}}$$

$\sim$

Allowable Span = 190 [cm]

Designed Type

0.8 $\longrightarrow$ Size up to 1.0 M/M

n of Mezzanine Floor

0.121 [t/m²]

1.2 Deck Plate Z = 35.5 J = 136

-31)

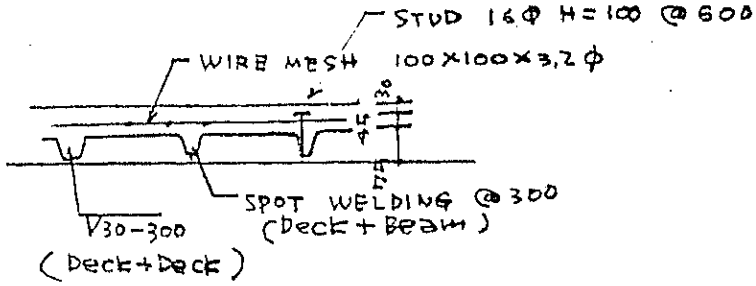
$$\frac{\alpha l^2}{8Z} < f \sim l > \sqrt{\frac{8Zf}{\alpha}}$$

$$= \sqrt{\frac{8 \times 35.5 \times 1.4}{0.0051}} = 279.2$$

$$\frac{5}{384}\frac{\alpha l^4}{EJ} < \frac{l}{300} \sim l > \sqrt[3]{\frac{384 EJ}{1500 \alpha}}$$

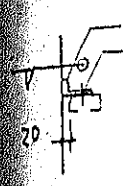
$$= \sqrt[3]{\frac{384 \times 2,100 \times 136}{1,500 \times 0.0051}} = 242.9$$

—— Allowable Span 240 [cm]



sign of Furring Strip

Wall



MONITOR ROOF [-120×60×25-4.5 @≒900

GENERAL [-100×50×20-3.2 @≒900
OR -2.3 @≒700

MONITOR ROOF ~ GENERAL WALL

	SPAN		@	D.L.	W.L.		
H.R.F.	3.68	~ 3.85	0.9~0.7	50	220	~	140
P.S.	3.60	~ 3.60	〃	〃	180	~	120
H.F.	/	~ 3.53	〃	〃	/	~	120
P.R.F.	3.53	~ 3.90	〃	〃	180	~	120
P.B.F.	3.45	~ 3.25	〃	〃	180	~	120
P.M.C.F.	3.00	~ 3.38	〃	〃	180	~	120

(H.R.F. MONITOR ROOF)

D.L. $0.05 \times 0.9 = 0.045$ [t/m]

W.L. $0.22 \times 0.8 \times 0.9 = 0.158$ [〃]

span 3.68 [m]

[-100×50×20-2.3

$$\frac{\sigma}{f} = \frac{3.68^2 \times 100}{8 \times 1.4}\left(\frac{0.045}{5.06} + \frac{0.158}{16.1}\right)$$

$$= 2.08 < 2.10$$

$$\delta = \frac{5 \times 368^4}{384 \times 2100}\sqrt{\left(\frac{0.00045}{19.6}\right)^2 + \left(\frac{0.00158}{80.7}\right)^2}$$

$$= 3.49 \text{ [cm]}$$

[-100×50×20-3.2

$$\delta = \frac{5 \times 368^4}{384 \times 2100}\sqrt{\left(\frac{0.00045}{24.5}\right)^2 + \left(\frac{0.00158}{107}\right)^2}$$

$$= 2.67 \text{ [cm]}$$

[-100×50×20-4.5

$$\delta = \frac{5 \times 368^4}{384 \times 2100}\sqrt{\left(\frac{0.00045}{30.9}\right)^2 + \left(\frac{0.00158}{139}\right)^2}$$

$$= 2.10 \text{ [cm]}$$

[-120×60×25-4.5

$$= \sqrt{\left(\frac{\quad}{58.0}\right)^2 + \left(\frac{\quad}{252.0}\right)^2}$$

$$= 1.13 \text{ [cm]}$$

$\delta/\text{span} = 1.13/368 = 1/324 < 1/300$

o.k.

2. (H.R.F. MONITOR ROOF)

D.L. $0.05 \times 0.9 = 0.045$ [t/m]
W.L. $0.18 \times 0.8 \times 0.9 = 0.130$ [〃]
Span 3.60 [m]

[- 100 × 50 × 20 - 3.2

$$\delta = \frac{5 \times 360^4}{384 \times 2{,}100} \sqrt{\left(\frac{0.00045}{24.5}\right)^2 + \left(\frac{0.00158}{107}\right)^2}$$

$= 2.45$ [cm]

[- 100 × 50 × 20 - 4.5

$$\delta = \sqrt{\left(\frac{\quad}{30.9}\right)^2 + \left(\frac{\quad}{139}\right)^2}$$

$= 1.92$ [cm]

[- 120 × 60 × 25 - 4.5

$$\delta = \sqrt{\left(\frac{\quad}{58.0}\right)^2 + \left(\frac{\quad}{252.0}\right)^2}$$

$= 1.03$ [cm]

$\delta/\text{span} = 1.03/360 = 1/346 < 1/300$
O.K.

3. (H.R.F. GENERAL WALL)

D.L. $0.05 \times 0.9 = 0.045$ [t/m]
W.L. $0.14 \times 0.8 \times 0.9 = 0.101$ [〃]
Span 3.85 m

[- 100 × 50 × 20 - 2.3

$$\delta = \frac{1 \times 385^4}{185 \times 2{,}100} \sqrt{\left(\frac{0.00045}{19.0}\right)^2 + \left(\frac{0.00101}{80.7}\right)^2}$$

$= 1.51$ [cm]

[- 100 × 50 × 20 - 3.2

$$\delta = \sqrt{\left(\frac{\quad}{24.5}\right)^2 + \left(\frac{\quad}{107}\right)^2}$$

$= 1.17$ [cm]

$\delta/\text{span} = 1.17/385 = 1/330 < 1/300$
O.K.

4. (〃)

D.L. $0.02 \times 0.7 = 0.014$ [t/m]
W.L. $0.14 \times 0.8 \times 0.17 = 0.018$ [〃]
Span 3.85 m

[- 100 × 50 × 20 - 2.3

$$\delta = \frac{1 \times 385^4}{185 \times 2{,}100} \sqrt{\left(\frac{0.00014}{19.0}\right)^2 + \left(\frac{0.00018}{80.7}\right)^2}$$

$= 0.69$ [cm]

$\delta/\text{span} = 0.69/385 = 1/560 < 1/300$
O.K.