

## 添付資料 11 構造検討書

STELCO BUILDING

- 1. 屋上取り付け鉄骨支持架台の設計 . . . . . SB-1
- 2. 既存建物安全性の確認 . . . . . SB-31

Kalaafaanu School

Thaajuddeen School

New Secondary School for Girls

- 1. 架台受の検討 . . . . . KTN-8
- 2. 既存部材の検討 . . . . . KTN-9
- 3. As-Build DWG . . . . . KTN-39
- 4. Kalaafaanu School Panel Foundation . . . . . KTN-90

Center for Social Education

- 1. As-Build DWG . . . . . SC-1
- 2. 既存部材の検討 . . . . . SC-22

President Office

- 1. 既存部材の検討 . . . . . PO-1
- 2. As-Build DWG . . . . . PO-4

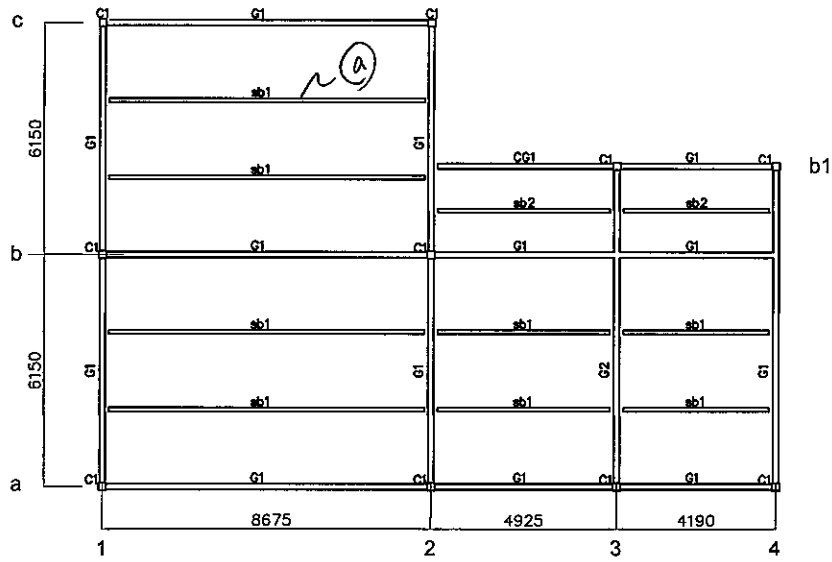
No. 1.

STELCO BUILDING.

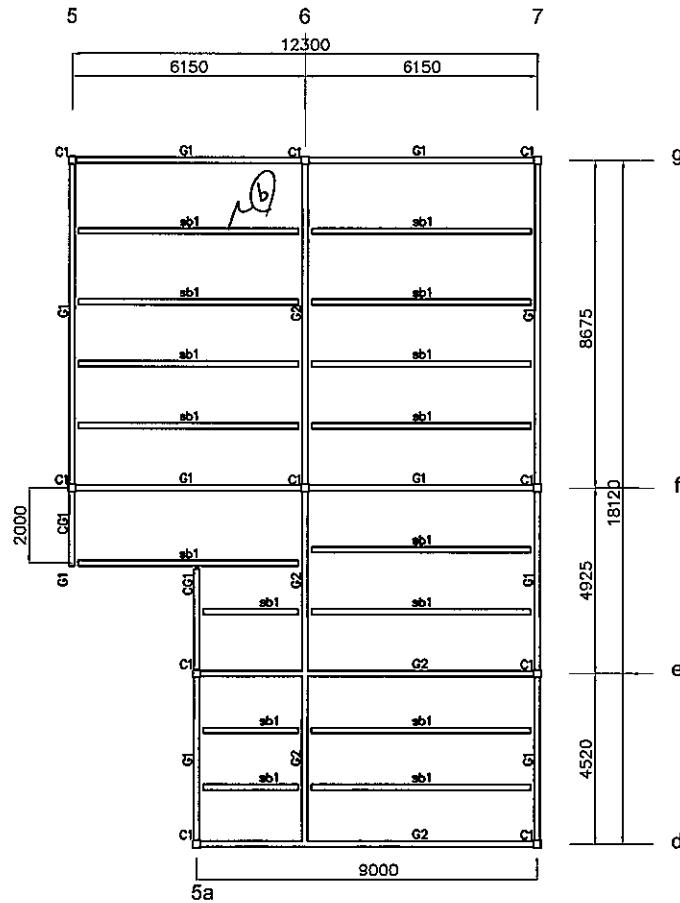
- ・ PV パネルと受け材の重量を  $0.5 \text{ kN/m}^2$  とする。
- ・ 鉄骨支持部材を新規に設計する。
- ・ 屋上 RC 床の上に基礎を作り設置する。
- ・ 屋上部材は追加重量を加味し検討した。
- ・ 主要構造部材は追加重量が  $0.5 \text{ kN/m}^2$  なので安全性に問題はない。

1. 屋上取り付鉄骨支持架台の設計

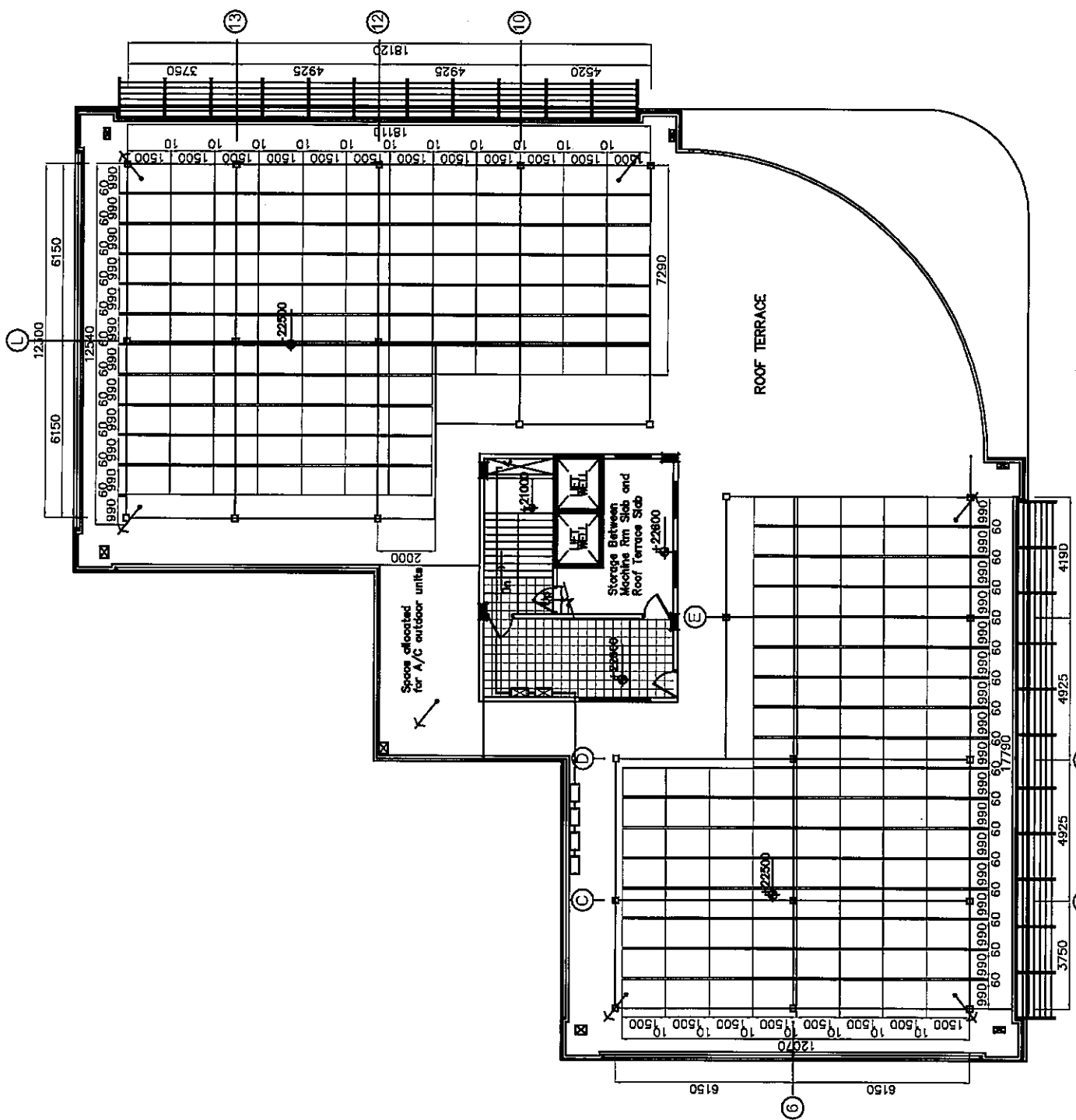
The design of the roof installation steel



PLAN OF A-STRUCTURE



PLAN OF B-STRUCTURE



Roof Terrace Plan / Machine Room Plan

< Sub-Beam >

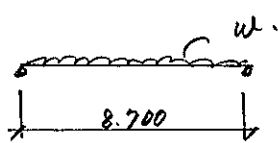
Dead Load.

PV. Panel + panel Frame.  $500 \text{ N/m}^2$

Self. weight.

$500 \text{ N/m}$

Type - (a)



$$w = 0.5 \times 2.1 \text{ m} + 0.5 = 1.55 \text{ kN/m}$$

Stress

$$M = \frac{1}{8} \times 1.55 \times 8.7^2 = 14.7 \text{ kNm}$$

$$Q = \frac{1}{2} \times 1.55 \times 8.7 = 6.8 \text{ kN}$$

$$\underline{H-194 \times 150 \times 6 \times 9} \quad I_x = 2630 \quad z_x = 271 \quad l_b = 8700.$$

$$f_b = \frac{89000 \times 150 \times 9}{8700 \times 194} = 71 \text{ N/mm}^2$$

$$\sigma_b = \frac{14.7 \times 10^3}{271} = 55 \text{ N/mm}^2$$

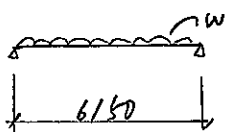
$$\sigma_b / f_b = 0.78 < 1.0$$

OK

$$\tau = \frac{6.8 \times 10^3}{176 \times 6} = 6.5 < 90 \text{ OK}$$

$$\delta_{\max} = \frac{5 \times 1.55 \times 8.7^4 \times 10}{3.84 \times 2.05 \times 2630} = 21.5 \text{ mm} = \frac{1}{404} \text{ OK}$$

Type - (b)



$$w = 0.5 \text{ kN/m} \times 1.735 \text{ m} + 0.5 = 1.37 \text{ kN/m}$$

Stress

$$M = \frac{1}{8} \times 1.37 \times 6.15^2 = 6.5 \text{ kNm}$$

$$Q = \frac{1}{2} \times 1.37 \times 6.15 = 4.3 \text{ kN}$$

$$\underline{H-198 \times 99 \times 4.5 \times 7} \quad I_x = 1540 \quad z_x = 156 \quad l_b = 6150.$$

$$f_b = \frac{89000 \times 99 \times 7}{6150 \times 198} = 50 \text{ N/mm}^2$$

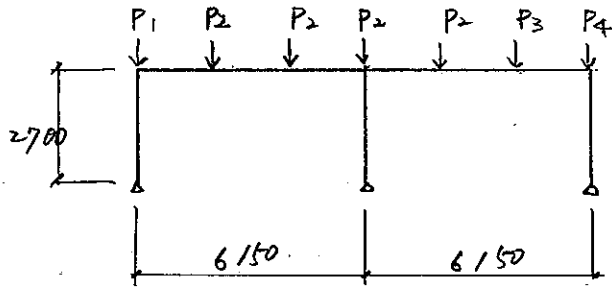
$$\sigma_b = \frac{6.5 \times 10^3}{156} = 42 \quad \sigma_b / f_b = 0.84 < 1.0$$

OK

$$\tau = \frac{4.3 \times 10^3}{184 \times 4.5} = 5.2 < 90 \text{ OK}$$

$$\delta_{\max} = \frac{5 \times 1.37 \times 6.15^4 \times 10}{3.84 \times 2.05 \times 1540} = 8.1 \text{ mm} = \frac{1}{759} \text{ OK}$$

<Main Frame >



A-STRUCTURE  
LINE 2

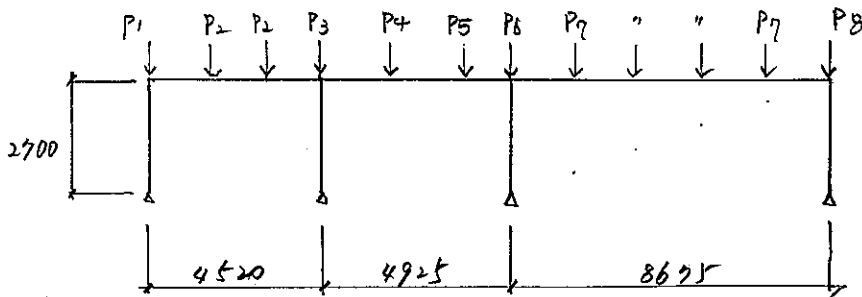
LOAD. Panel + frame.  $500 \text{ N/m}^2$   
 beam + frame  $1000 \text{ N/m}^2$  }  $1.5 \text{ kN/m}^2$ .

$$P_1 = 1.5 \times (8.676 + 4.925) \times \frac{1}{2} \times 1.025^m = 10.5 \text{ kN}$$

$$P_3 = 1.5 \times 2.05 \times 4.4 = 13.6 \text{ kN}$$

$$P_2 = \text{''} \times 2.05^m = 21. \text{ kN}$$

$$P_4 = 1.5 \times 1.025 \times 4.4 = 6.8$$



B-STRUCTURE  
LINE-7

LOAD.  $1.5 \text{ kN/m}^2$ .

$$P_1 = 1.5 \times 4.6^m \times 0.76^m = 5.3 \text{ kN}$$

$$P_6 = 1.5 \times 6.15 \times 1.69^m = 15.6 \text{ kN}$$

$$P_2 = 1.5 \times 4.6^m \times 1.5^m = 10.5 \text{ kN}$$

$$P_7 = \text{''} \times 1.735^m = 16.1 \text{ kN}$$

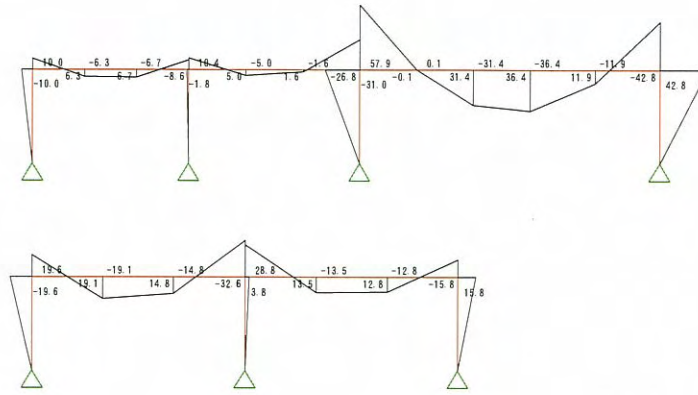
$$P_3 = 1.5 \times 4.6^m \times 1.58^m = 11.0 \text{ kN}$$

$$P_8 = \text{''} \times 0.87 = 8.1 \text{ kN}$$

$$P_4 = 1.5 \times 4.6 \times 1.65^m = 11.4 \text{ kN}$$

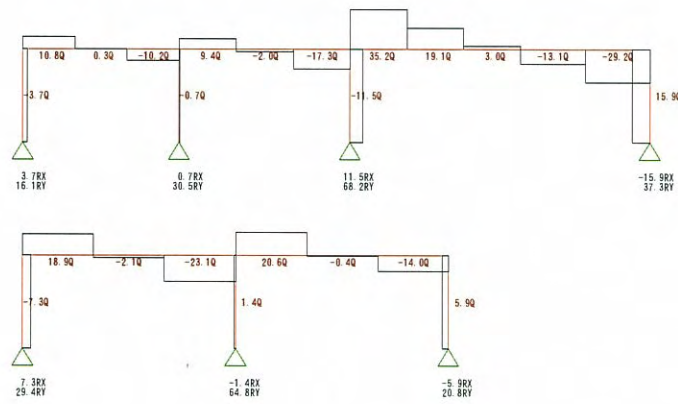
$$P_5 = 1.5 \times 6.15 \times 1.65^m = 15.3 \text{ kN}$$





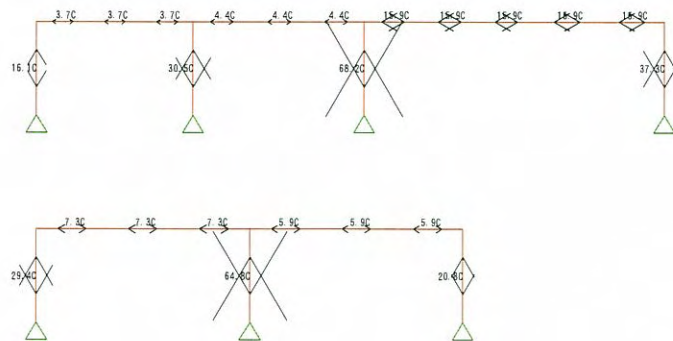
*Bending Moment*

応力図 [DL]



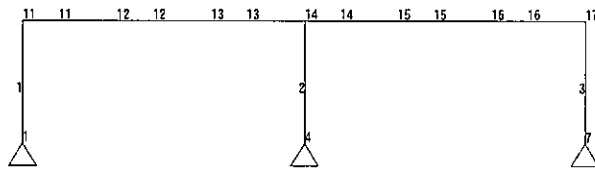
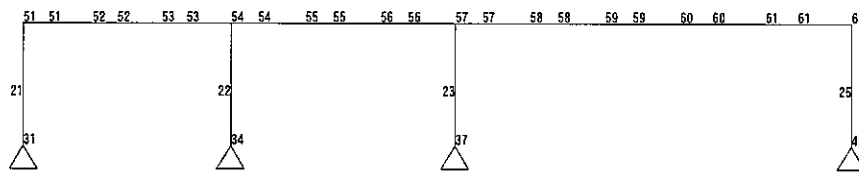
*Shear*

応力図 [DL]



*Axial*





7

SB-6

【基本事項・計算条件】

工事名: STELGO ROOF STRUCTURE  
略称: MOSTEL-11  
日付: 2009/06/11  
担当: YEC

- ・せん断による変形の考慮 : する
- ・剛域の考慮 : する
- ・伸縮しない材 (Aを1000倍) : 有
- ・節点同一変位の指定 : 有
- ・部材毎の増減率の考慮 : 無
- ・パネ材の使用 : しない
- ・結合状態の共通指定 : 部材毎に指定
- ・応力着目点の追加 : しない
- ・接合部バネ変形の考慮 : しない
- ・剛域・バネの軸変形の考慮 : しない
- ・剛域を考慮した固定端モーメントの計算 : しない
- ・部材端と節点のズレ : 無
- ・分布バネ : 無

・出力単位 : S I 単位

【節点座標】 [m]

No	X座標	Y座標	No	X座標	Y座標	No	X座標	Y座標
1	0.000	0.000	31	0.000	6.000	57	9.445	8.700
4	6.150	0.000	34	4.520	6.000	58	11.085	8.700
7	12.300	0.000	37	9.445	6.000	59	12.730	8.700
11	0.000	2.700	42	18.120	6.000	60	14.370	8.700
12	2.050	2.700	51	0.000	8.700	61	16.245	8.700
13	4.100	2.700	52	1.506	8.700	62	18.120	8.700
14	6.150	2.700	53	3.014	8.700			
15	8.200	2.700	54	4.520	8.700			
16	10.250	2.700	55	6.160	8.700			
17	12.300	2.700	56	7.805	8.700			

【支点データ】 [kN/cm] [kNm/rad] (0は自由、1は拘束を表します。)

No	節点No. <1>	<2>	<3>	X方向バネ	Y方向バネ	回転バネ
1	1	4	7	1.0	1.0	0.0
2	31	34	37	1.0	1.0	0.0
3	42			1.0	1.0	0.0

【節点同一変位】

---- 入力値なし ----

【材質】 [kN/mm<sup>2</sup>]

No	E	G
1	205.00	79.00

【断面性能】

No	A [cm <sup>2</sup> ]	I [cm <sup>4</sup> ]	κ	断面名
1	38.11	2625	3.61	H-194*150*6*9
11	59.24	3566	2.00	□-200*200*8 r20

【部材配置】 (断面No. が負値の材は、伸縮しない材を表します。)

No	/--節点No--/ i 端 j 端		断面No	材質No	/--結合No --/-- i 端 j 端		/--剛域 [cm] --/ i 端 j 端	
1	1	11	11	1	0	0	0.0	0.0
2	4	14	11	1	0	0	0.0	0.0
3	7	17	11	1	0	0	0.0	0.0
11	11	12	1	1	0	0	0.0	0.0
12	12	13	1	1	0	0	0.0	0.0
13	13	14	1	1	0	0	0.0	0.0
14	14	15	1	1	0	0	0.0	0.0
15	15	16	1	1	0	0	0.0	0.0
16	16	17	1	1	0	0	0.0	0.0
21	31	51	11	1	0	0	0.0	0.0
22	34	54	11	1	0	0	0.0	0.0
23	37	57	11	1	0	0	0.0	0.0
25	42	62	11	1	0	0	0.0	0.0
51	51	52	1	1	0	0	0.0	0.0
52	52	53	1	1	0	0	0.0	0.0
53	53	54	1	1	0	0	0.0	0.0
54	54	55	1	1	0	0	0.0	0.0
55	55	56	1	1	0	0	0.0	0.0
56	56	57	1	1	0	0	0.0	0.0
57	57	58	1	1	0	0	0.0	0.0
58	58	59	1	1	0	0	0.0	0.0
59	59	60	1	1	0	0	0.0	0.0
60	60	61	1	1	0	0	0.0	0.0
61	61	62	1	1	0	0	0.0	0.0

【荷重ケース 1】 DL

No	/--節点, 部材No. --/ <1> <2> <3>			TYPE	方向	P 1	P 2	P 3	P 4	P 5	P 6
1	11			0		0.000kN	-10.500kN	0.000kNm			
2	12	~	15	0		0.000kN	-21.000kN	0.000kNm			
3	16			0		0.000kN	-13.600kN	0.000kNm			
4	17			0		0.000kN	-6.800kN	0.000kNm			
5	51			0		0.000kN	-5.300kN	0.000kNm			
6	52	53		0		0.000kN	-10.500kN	0.000kNm			
7	54			0		0.000kN	-11.000kN	0.000kNm			
8	55			0		0.000kN	-11.400kN	0.000kNm			
9	56			0		0.000kN	-15.300kN	0.000kNm			
10	57			0		0.000kN	-15.600kN	0.000kNm			
11	58	~	61	0		0.000kN	-16.100kN	0.000kNm			
12	62			0		0.000kN	-8.100kN	0.000kNm			

【支点反力】

※※ 荷重ケース 1 ※※ DL

節点No	Rx [kN]	Ry [kN]	Rm [kNm]	節点No	Rx [kN]	Ry [kN]	Rm [kNm]
1	7.3	29.4	0.0	37	11.5	68.2	0.0
4	-1.4	64.8	0.0	42	-15.9	37.3	0.0
7	-5.9	20.8	0.0				
31	3.7	16.1	0.0				
34	0.7	30.5	0.0				
				合計	0.0	267.0	0.0

【節点変位】

※※ 荷重ケース 1 ※※ DL

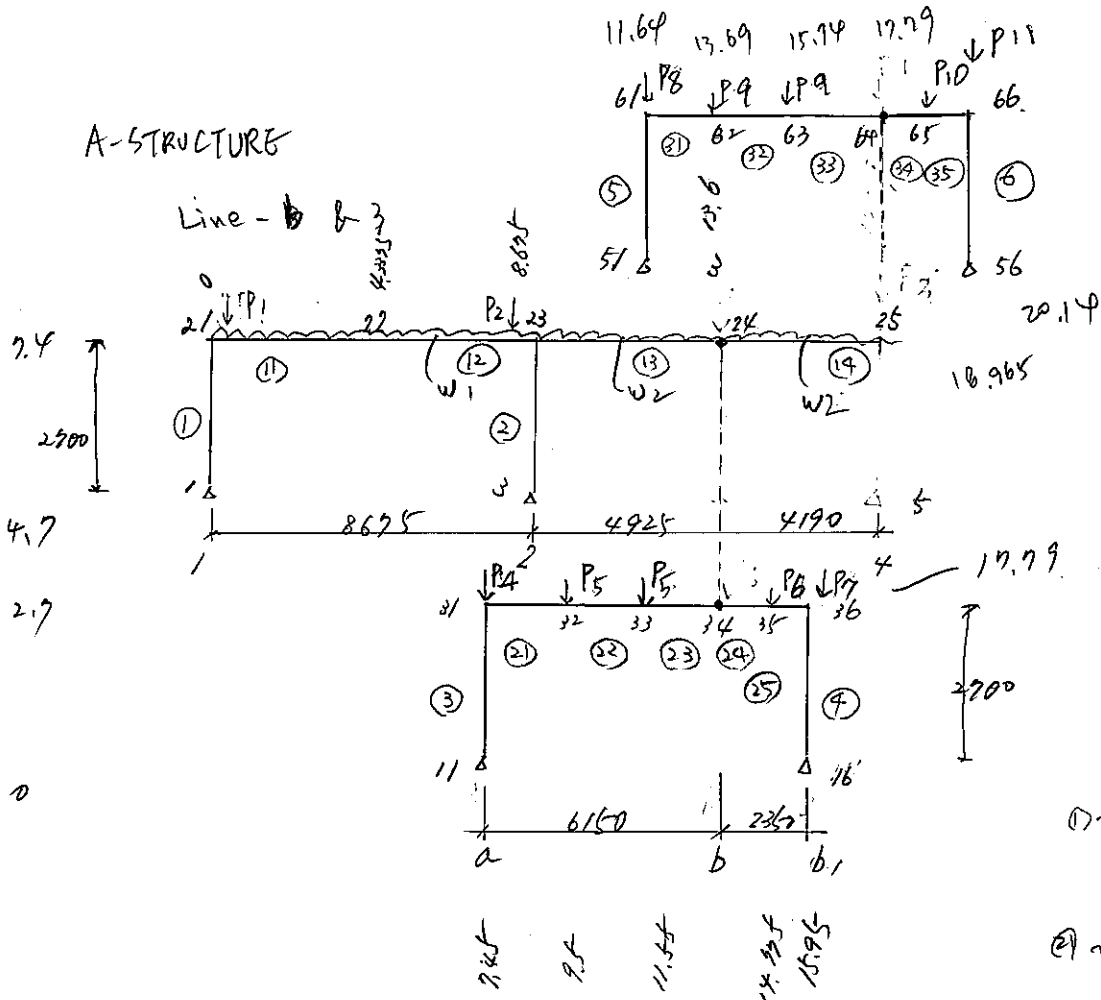
節点No	$\delta x$ [cm]	$\delta y$ [cm]	$\theta$ [rad]	節点No	$\delta x$ [cm]	$\delta y$ [cm]	$\theta$ [rad]
1	0.000000	0.000000	0.00087968	52	-0.224480	-0.183477	-0.00094818
4	0.000000	0.000000	-0.00050488	53	-0.225197	-0.191304	0.00087447
7	0.000000	0.000000	-0.00120866	54	-0.225913	-0.006789	0.00061679
11	0.080401	-0.006534	-0.00274594	55	-0.226829	-0.054870	-0.00019961
12	0.078493	-0.878471	-0.00264967	56	-0.227749	0.013660	0.00081253
13	0.076585	-0.768492	0.00359741	57	-0.228666	-0.015157	-0.00302428
14	0.074677	-0.014396	0.00019809	58	-0.231996	-1.544899	-0.01185222
15	0.073139	-0.598397	-0.00271426	59	-0.235337	-3.270676	-0.00706816
16	0.071600	-0.635869	0.00229377	60	-0.238668	-3.610155	0.00325325
17	0.070062	-0.004615	0.00171400	61	-0.242476	-2.050118	0.01165101
31	0.000000	0.000000	0.00143015	62	-0.246284	-0.008286	0.00625369
34	0.000000	0.000000	0.00094249				
37	0.000000	0.000000	0.00270880				
42	0.000000	0.000000	-0.00165690				
51	-0.223764	-0.003584	-0.00042165				

【部材応力】

※※ 荷重ケース 1 ※※ DL

部材No	節点No		M [kNm]		Q [kN]		N [kN]		
	i 端	j 端	i 端	中央	i 端	j 端	i 端	j 端	
1	1	11	0.0	-9.8	-19.6	-7.3	7.3	29.4	-29.4
2	4	14	0.0	1.9	3.8	1.4	-1.4	64.8	-64.8
3	7	17	0.0	7.9	15.8	5.9	-5.9	20.8	-20.8
11	11	12	19.6	-0.3	19.1	18.9	-18.9	7.3	-7.3
12	12	13	-19.1	16.9	14.8	-2.1	2.1	7.3	-7.3
13	13	14	-14.8	-8.9	-32.6	-23.1	23.1	7.3	-7.3
14	14	15	28.8	-7.6	13.5	20.6	-20.6	5.9	-5.9
15	15	16	-13.5	13.1	12.8	-0.4	0.4	5.9	-5.9
16	16	17	-12.8	-1.5	-15.8	-14.0	14.0	5.9	-5.9
21	31	51	0.0	-5.0	-10.0	-3.7	3.7	16.1	-16.1
22	34	54	0.0	-0.9	-1.8	-0.7	0.7	30.5	-30.5
23	37	57	0.0	-15.5	-31.0	-11.5	11.5	68.2	-68.2
25	42	62	0.0	21.4	42.8	15.9	-15.9	37.3	-37.3
51	51	52	10.0	-1.9	6.3	10.8	-10.8	3.7	-3.7
52	52	53	-6.3	6.5	6.7	0.3	-0.3	3.7	-3.7
53	53	54	-6.7	-0.9	-8.6	-10.2	10.2	3.7	-3.7
54	54	55	10.4	-2.7	5.0	9.4	-9.4	4.4	-4.4
55	55	56	-5.0	3.3	1.6	-2.0	2.0	4.4	-4.4
56	56	57	-1.6	-12.6	-26.8	-17.3	17.3	4.4	-4.4
57	57	58	57.9	-29.0	-0.1	35.2	-35.2	15.9	-15.9
58	58	59	0.1	15.7	31.4	19.1	-19.1	15.9	-15.9
59	59	60	-31.4	33.9	36.4	3.0	-3.0	15.9	-15.9
60	60	61	-36.4	24.1	11.9	-13.1	13.1	15.9	-15.9
61	61	62	-11.9	-15.5	-42.8	-29.2	29.2	15.9	-15.9

# A-STRUCTURE



LOAD.  $1.5 \text{ kN/m}^2$

$$W_1 = 1.5 \times 2.05^2 = 3.08 \text{ kN/m}$$

$$W_2 = 1.5 \times (1.025 + 0.5875) = 2.42 \text{ kN/m}$$

$$P_1 = 1.5 \times (8.675 \times 1/2 \times 2.05) \times 2 = 26.7 \text{ kN}$$

$$P_2 = P_1 + 1.5 \times (2.05 \times 4.925 \times 1/2 + 1.175 \times 4.925 \times 1/2 \times 4.975 / 6.15 + 0.5875 \times 4.925 \times 1/2 \times 3.8 / 6.15) = 39.2 \text{ kN}$$

$P_3 = \text{Noe King}$

$$P_4 = 1.5 \times (1.025 \times 4.558) = 7.1$$

$$P_5 = 1.5 \times 2.05 \times 4.558 = 14.1$$

$$P_6 = 1.5 \times 1.175 \times 4.558 = 8.1$$

$$P_7 = 1.5 \times 0.5875 \times 4.558 = 4.1$$

$$P_8 = 1.5 \times 1.025 \times 2.095 = 3.3$$

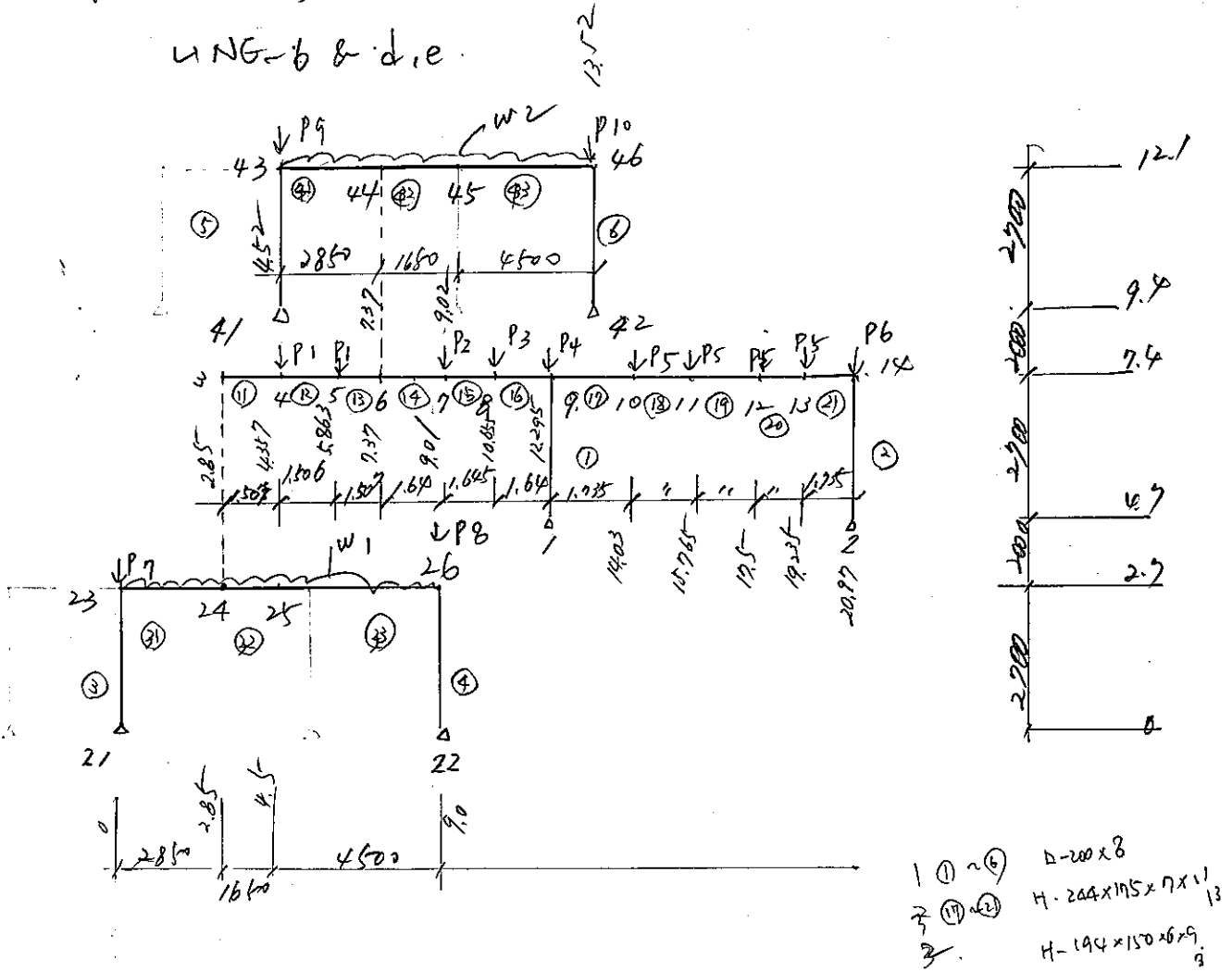
$$P_9 = 1.5 \times 2.05 \times \dots = 6.5$$

$$P_{10} = 1.5 \times 1.175 \times 2.095 = 3.7$$

$$P_{11} = 1.5 \times 0.5875 \times 2.095 = 1.9$$

# STRUCTURE - B

UNG-b & d.e.



## LOAD

$$w_1 = 1.5 \frac{\text{kN}}{\text{m}^2} \times 0.754 = 1.14 \frac{\text{kN}}{\text{m}}$$

$$w_2 = 1.5 \frac{\text{kN}}{\text{m}^2} \times 1.58 \text{m} = 2.37 \frac{\text{kN}}{\text{m}}$$

$$P_1 = 1.5 \times (1.507 \times 4.5) = 10.2 \text{ kN}$$

$$P_5 = 1.5 \times 1.735 \times 6.15 = 16.1 \text{ kN}$$

$$P_2 = 1.5 \times 1.641 \times 4.5 = 11.1 \text{ kN}$$

$$P_6 = 1.5 \times 0.868 \times 6.15 = 8.1 \text{ kN}$$

$$P_3 = 1.5 \times 1.641 \times 6.15 = 15.2 \text{ kN}$$

$$P_7 = 1.5 \times 1.507 \times 1.425 = 3.23 \text{ kN}$$

$$P_4 = 1.5 \times 1.69 \times 6.15 = 15.6 \text{ kN}$$

$$P_8 = 1.5 \times 1.507 \times 3.075 = 7.0 \text{ kN}$$

$$P_9 = P_1 + 1.5 \times 1.641 \times 1.425 = 6.8 \text{ kN}$$

$$P_{10} = P_8 + 1.5 \times 1.641 \times 3.075 = 14.6 \text{ kN}$$

【基本事項・計算条件】

工 事 名 : STELCO A Line-b  
 略 称 : STELCOA-b  
 日 付 : 2009/10/12  
 担 当 者 :

- ・せん断による変形の考慮 : する
  - ・剛域の考慮 : する
  - ・伸縮しない材 (Aを1000倍) : 有
  - ・節点同一変位の指定 : 有
  - ・部材毎の増減率の考慮 : 無
  - ・ハネ材の使用 : しない
  - ・結合状態の共通指定 : 部材毎に指定
  - ・応力着目点の追加 : しない
  - ・接合部ハネの変形の考慮 : しない
  - ・剛域・ハネの軸変形の考慮 : しない
  - ・剛域を考慮した固定端モーメントの計算 : しない
  - ・部材端と節点のスレ : 無
  - ・分布ハネ : 無
- ・出力単位 : S I 単位

GRIP

【節点座標】 [m]

No	X座標	Y座標	No	X座標	Y座標	No	X座標	Y座標
1	0.000	4.700	32	9.500	2.700	64	17.790	12.100
3	8.675	4.700	33	11.550	2.700	65	18.965	12.100
11	7.450	0.000	34	13.600	2.700	66	20.140	12.100
16	15.950	0.000	35	14.775	2.700			
21	0.000	7.400	36	15.950	2.700			
22	4.338	7.400	51	11.640	9.400			
23	8.675	7.400	56	20.140	9.400			
24	13.600	7.400	61	11.640	12.100			
25	17.790	7.400	62	13.690	12.100			
31	7.450	2.700	63	15.740	12.100			

Boundary

【支点データ】 [kN/cm] [kNm/rad] (0は自由、1は拘束を表します。)

No	ノードNo. <1>	ノードNo. <2>	ノードNo. <3>	X方向ハネ	Y方向ハネ	回転ハネ
1	1	3	11	1.0	1.0	0.0
2	16	51	56	1.0	1.0	0.0

【節点同一変位】

No	ノードNo. <1>	ノードNo. <2>	ノードNo. <3>	同一変位
1	24	34		Y
2	25	64		Y

【材質】 [kN/mm<sup>2</sup>]

No	E	G
1	205.00	79.00

【断面性能】

No	Area A [cm <sup>2</sup> ]	Inertia I [cm <sup>4</sup> ]	K	断面名
1	59.24	3566	2.00	BOX-200*200*8*20
2	38.11	2625	3.61	H-194*150*6*9*8
3	55.49	6037	3.57	H-244*175*7*11*13



Member array

【部材配置】 (断面No. が負値の材は、伸縮しない材を表します。)

No	ノードNo		断面No	材質No	結合No		剛域 [cm]	
	i 端	j 端			i 端	j 端	i 端	j 端
1	1	21	1	1	0	0	0.0	0.0
2	3	23	1	1	0	0	0.0	0.0
3	11	31	1	1	0	0	0.0	0.0
4	16	36	1	1	0	0	0.0	0.0
5	51	61	1	1	0	0	0.0	0.0
6	56	66	1	1	0	0	0.0	0.0
11	21	22	2	1	0	0	0.0	0.0
12	22	23	2	1	0	0	0.0	0.0
13	23	24	2	1	0	0	0.0	0.0
14	24	25	2	1	0	0	0.0	0.0
21	31	32	3	1	0	0	0.0	0.0
22	32	33	3	1	0	0	0.0	0.0
23	33	34	3	1	0	0	0.0	0.0
24	34	35	3	1	0	0	0.0	0.0
25	35	36	3	1	0	0	0.0	0.0
31	61	62	2	1	0	0	0.0	0.0
32	62	63	2	1	0	0	0.0	0.0
33	63	64	2	1	0	0	0.0	0.0
34	64	65	2	1	0	0	0.0	0.0
35	65	66	2	1	0	0	0.0	0.0

Load

【節点荷重】

※※ 荷重ケース 1 ※※ DL

節点No	Px [kN]	Py [kN]	M [kNm]	節点No	Px [kN]	Py [kN]	M [kNm]
1	0.0	0.0	0.0	51	0.0	0.0	0.0
3	0.0	0.0	0.0	56	0.0	0.0	0.0
11	0.0	0.0	0.0	61	0.0	-3.3	0.0
16	0.0	0.0	0.0	62	0.0	-6.5	0.0
21	0.0	-33.4	-4.8	63	0.0	-6.5	0.0
22	0.0	-13.4	0.0	64	0.0	0.0	0.0
23	0.0	-51.8	-0.1	65	0.0	-3.7	0.0
24	0.0	-11.0	1.4	66	0.0	-1.9	0.0
25	0.0	-5.1	3.5				
31	0.0	-7.1	0.0				
32	0.0	-14.1	0.0				
33	0.0	-14.1	0.0				
34	0.0	0.0	0.0				
35	0.0	-8.1	0.0				
36	0.0	-4.1	0.0				

Member Load

【部材荷重】

※※ 荷重ケース 1 ※※ DL

部材No	ノードNo		M [kNm]	Q [kN]		N [kN]	
	i 端	j 端		M <sub>o</sub>	i 端	j 端	i 端
1	1	21	0.0	0.0	0.0	0.0	0.0
2	3	23	0.0	0.0	0.0	0.0	0.0
3	11	31	0.0	0.0	0.0	0.0	0.0
4	16	36	0.0	0.0	0.0	0.0	0.0
5	51	61	0.0	0.0	0.0	0.0	0.0
6	56	66	0.0	0.0	0.0	0.0	0.0
11	21	22	-4.8	7.2	4.8	-6.7	-6.7
12	22	23	-4.8	7.2	4.8	-6.7	-6.7
13	23	24	-4.9	7.3	4.9	-6.0	-6.0
14	24	25	-3.5	5.3	3.5	-5.1	-5.1
21	31	32	0.0	0.0	0.0	0.0	0.0
22	32	33	0.0	0.0	0.0	0.0	0.0
23	33	34	0.0	0.0	0.0	0.0	0.0
24	34	35	0.0	0.0	0.0	0.0	0.0
25	35	36	0.0	0.0	0.0	0.0	0.0

部材No	ノ 節点No ノ		ノ 節点No ノ		M [kNm]		Q [kN]		N [kN]	
	i 端	j 端	i 端	j 端	Mo	ノ j 端	i 端	j 端	i 端	j 端
31	61	62	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	62	63	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33	63	64	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	64	65	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	65	66	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

【支点反力】

※※ 荷重ケース 1 ※※ DL

節点No	Rx [kN]	Ry [kN]	Rm [kNm]	節点No	Rx [kN]	Ry [kN]	Rm [kNm]
1	4.1	38.5	0.0	56	-5.9	13.7	0.0
3	-4.1	63.0	0.0				
11	9.9	28.3	0.0				
16	-9.9	26.8	0.0				
51	5.9	13.6	0.0				
				合計	0.0	184.1	0.0

【節点変位】

※※ 荷重ケース 1 ※※ DL

節点No	δx [cm]	δy [cm]	θ [rad]	節点No	δx [cm]	δy [cm]	θ [rad]
1	0.000000	0.000000	-0.00116558	51	0.000000	0.000000	0.00108685
3	0.000000	0.000000	-0.00246230	56	0.000000	0.000000	-0.00079658
11	0.000000	0.000000	0.00155786	61	-0.035983	-0.003025	-0.00184940
16	0.000000	0.000000	-0.00162902	62	-0.037528	-0.753361	-0.00388291
21	0.492016	-0.008565	-0.00318767	63	-0.039074	-1.253285	-0.00040806
22	0.489764	-1.187946	0.00086993	64	-0.040619	-0.893803	0.00349981
23	0.487512	-0.014017	-0.00044021	65	-0.041505	-0.415723	-0.00409678
24	0.487512	-1.039964	-0.00140454	66	-0.042390	-0.003047	0.00213967
25	0.487512	-0.893803	0.00190844				
31	0.013315	-0.006302	-0.00339090				
32	0.011526	-0.945450	-0.00422307				
33	0.009737	-1.455790	-0.00023511				
34	0.007949	-1.039964	0.00378501				
35	0.006923	-0.517599	0.00459532				
36	0.005898	-0.005969	0.00331974				

【部材応力】

※※ 荷重ケース 1 ※※ DL

部材No	ノ 節点No ノ		ノ 節点No ノ		M [kNm]		Q [kN]		N [kN]	
	i 端	j 端	i 端	j 端	中央	ノ j 端	i 端	j 端	i 端	j 端
1	1	21	0.0	-5.5	-11.0	-4.1	4.1	38.5	-38.5	
2	3	23	0.0	5.5	11.0	4.1	-4.1	63.0	-63.0	
3	11	31	0.0	-13.4	-26.8	-9.9	9.9	28.3	-28.3	
4	16	36	0.0	13.4	26.8	9.9	-9.9	26.8	-26.8	
5	51	61	0.0	-8.0	-15.9	-5.9	5.9	13.6	-13.6	
6	56	66	0.0	8.0	15.9	5.9	-5.9	13.7	-13.7	
11	21	22	11.0	7.4	11.4	11.8	1.5	4.1	-4.1	
12	22	23	-11.4	0.8	-24.3	-1.5	14.9	4.1	-4.1	
13	23	24	13.3	1.4	1.4	9.0	3.0	0.0	0.0	
14	24	25	-1.4	6.0	0.0	4.7	5.4	0.0	0.0	
21	31	32	26.8	-5.0	16.8	21.2	-21.2	9.9	-9.9	
22	32	33	-16.8	24.1	31.4	7.1	-7.1	9.9	-9.9	
23	33	34	-31.4	24.3	17.1	-7.0	7.0	9.9	-9.9	
24	34	35	-17.1	8.5	-0.1	-14.6	14.6	9.9	-9.9	
25	35	36	0.1	-13.4	-26.8	-22.7	22.7	9.9	-9.9	
31	61	62	15.9	-5.3	5.2	10.3	-10.3	5.9	-5.9	
32	62	63	-5.2	9.1	13.0	3.8	-3.8	5.9	-5.9	
33	63	64	-13.0	10.3	7.5	-2.7	2.7	5.9	-5.9	
34	64	65	-7.5	2.7	-2.0	-8.1	8.1	5.9	-5.9	
35	65	66	2.0	-9.0	-15.9	-11.8	11.8	5.9	-5.9	

【基本事項・計算条件】

工 事 名 : STELCO B Line-6  
略 称 : STELCOB-6  
日 付 : 2009/10/12  
担 当 者 :

- せん断による変形の考慮 : する
  - 剛域の考慮 : する
  - 伸縮しない材 (Aを1000倍) : 有
  - 節点同一変位の指定 : 有
  - 部材毎の増減率の考慮 : 無
  - ハネ材の使用 : しない
  - 結合状態の共通指定 : 部材毎に指定
  - 応力着目点の追加 : しない
  - 接合部ハネの軸変形の考慮 : しない
  - 剛域・ハネの軸変形の考慮 : しない
  - 剛域を考慮した固定端モーメントの計算 : しない
  - 部材端と節点のスレ : 無
  - 分布ハネ : 無
- ・ 出力単位 : S I 単位

【節点座標】 [m]

No	X座標	Y座標	No	X座標	Y座標	No	X座標	Y座標
1	12.295	4.700	11	15.765	7.400	41	4.520	9.400
2	20.970	4.700	12	17.500	7.400	42	13.520	9.400
3	2.850	7.400	13	19.235	7.400	43	4.520	12.100
4	4.357	7.400	14	20.970	7.400	44	7.370	12.100
5	5.863	7.400	21	0.000	0.000	45	9.020	12.100
6	7.370	7.400	22	9.000	0.000	46	13.520	12.100
7	9.010	7.400	23	0.000	2.700			
8	10.655	7.400	24	2.850	2.700			
9	12.295	7.400	25	4.500	2.700			
10	14.030	7.400	26	9.000	2.700			

【支点データ】 [kN/cm] [kNm/rad] (0は自由、1は拘束を表します。)

No	ノードNo. <1>	ノードNo. <2>	ノードNo. <3>	X方向ハネ	Y方向ハネ	回転ハネ
1	1	2	21	1.0	1.0	0.0
2	22	41	42	1.0	1.0	0.0

【節点同一変位】

No	ノードNo. <1>	ノードNo. <2>	ノードNo. <3>	同一変位
1	3	24		Y
2	6	44		Y

【材質】 [kN/mm2]

No	E	G
1	205.00	79.00

【断面性能】

No	A [cm2]	I [cm4]	κ	断面名
1	59.24	3566	2.00	BOX-200*200*8*20
3	55.49	6037	3.57	H-244*175*7*11*13

【部材配置】 (断面No. が負値の材は、伸縮しない材を表します。)

No	ノードNo		断面No	材質No	結合No		剛域 [cm]	
	i 端	j 端			i 端	j 端	i 端	j 端
1	1	9	1	1	0	0	0.0	0.0
2	2	14	1	1	0	0	0.0	0.0
3	21	23	1	1	0	0	0.0	0.0
4	22	26	1	1	0	0	0.0	0.0
5	41	43	1	1	0	0	0.0	0.0
6	42	46	1	1	0	0	0.0	0.0
11	3	4	3	1	0	0	0.0	0.0
12	4	5	3	1	0	0	0.0	0.0
13	5	6	3	1	0	0	0.0	0.0
14	6	7	3	1	0	0	0.0	0.0
15	7	8	3	1	0	0	0.0	0.0
16	8	9	3	1	0	0	0.0	0.0
17	9	10	3	1	0	0	0.0	0.0
18	10	11	3	1	0	0	0.0	0.0
19	11	12	3	1	0	0	0.0	0.0
20	12	13	3	1	0	0	0.0	0.0
21	13	14	3	1	0	0	0.0	0.0
31	23	24	3	1	0	0	0.0	0.0
32	24	25	3	1	0	0	0.0	0.0
33	25	26	3	1	0	0	0.0	0.0
41	43	44	3	1	0	0	0.0	0.0
42	44	45	3	1	0	0	0.0	0.0
43	45	46	3	1	0	0	0.0	0.0

【節点荷重】

※※ 荷重ケース 1 ※※ DL

節点No	Px [kN]	Py [kN]	M [kNm]	節点No	Px [kN]	Py [kN]	M [kNm]
1	0.0	0.0	0.0	22	0.0	0.0	0.0
2	0.0	0.0	0.0	23	0.0	-4.9	-0.8
3	0.0	0.0	0.0	24	0.0	-2.6	0.5
4	0.0	-10.2	0.0	25	0.0	-3.5	-1.7
5	0.0	-10.2	0.0	26	0.0	-9.6	1.9
6	0.0	0.0	0.0	41	0.0	0.0	0.0
7	0.0	-11.1	0.0	42	0.0	0.0	0.0
8	0.0	-15.2	0.0	43	0.0	-10.2	-1.6
9	0.0	-15.6	0.0	44	0.0	-5.3	1.1
10	0.0	-16.1	0.0	45	0.0	-7.3	-3.5
11	0.0	-16.1	0.0	46	0.0	-19.9	4.0
12	0.0	-16.1	0.0				
13	0.0	-16.1	0.0				
14	0.0	-8.1	0.0				
21	0.0	0.0	0.0				

【部材荷重】

※※ 荷重ケース 1 ※※ DL

部材No	ノードNo		M [kNm]		Q [kN]		N [kN]	
	i 端	j 端	i 端	j 端	i 端	j 端	i 端	j 端
1	1	9	0.0	0.0	0.0	0.0	0.0	0.0
2	2	14	0.0	0.0	0.0	0.0	0.0	0.0
3	21	23	0.0	0.0	0.0	0.0	0.0	0.0
4	22	26	0.0	0.0	0.0	0.0	0.0	0.0
5	41	43	0.0	0.0	0.0	0.0	0.0	0.0
6	42	46	0.0	0.0	0.0	0.0	0.0	0.0
11	3	4	0.0	0.0	0.0	0.0	0.0	0.0
12	4	5	0.0	0.0	0.0	0.0	0.0	0.0
13	5	6	0.0	0.0	0.0	0.0	0.0	0.0
14	6	7	0.0	0.0	0.0	0.0	0.0	0.0

部材No	ノ節点No		M [kNm]			Q [kN]		N [kN]		
	i 端	j 端	i 端	中央	j 端	i 端	j 端	i 端	j 端	
15	7	8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
16	8	9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
17	9	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
18	10	11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
19	11	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
20	12	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
21	13	14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
31	23	24	-0.8	1.2	0.8	-1.6	-1.6	0.0	0.0	
32	24	25	-0.3	0.4	0.3	-0.9	-0.9	0.0	0.0	
33	25	26	-1.9	2.9	1.9	-2.6	-2.6	0.0	0.0	
41	43	44	-1.6	2.4	1.6	-3.4	-3.4	0.0	0.0	
42	44	45	-0.5	0.8	0.5	-2.0	-2.0	0.0	0.0	
43	45	46	-4.0	6.0	4.0	-5.3	-5.3	0.0	0.0	

【支点反力】

※※ 荷重ケース 1 ※※ DL

節点No	Rx [kN]	Ry [kN]	Rm [kNm]	節点No	Rx [kN]	Ry [kN]	Rm [kNm]
1	9.3	76.3	0.0	42	-7.7	29.1	0.0
2	-9.3	35.3	0.0				
21	5.1	15.9	0.0				
22	-5.1	15.6	0.0				
41	7.7	25.8	0.0				
合計	0.0	198.0	0.0				

【節点変位】

※※ 荷重ケース 1 ※※ DL

節点No	δx [cm]	δy [cm]	θ [rad]	節点No	δx [cm]	δy [cm]	θ [rad]
1	0.000000	0.000000	0.00408974	22	0.000000	0.000000	-0.00129571
2	0.000000	0.000000	0.00110478	23	0.131351	-0.003540	-0.00220001
3	-0.697715	-0.736762	-0.00284361	24	0.130076	-0.736762	-0.00155405
4	-0.697715	-1.127856	-0.00182779	25	0.129338	-0.806520	0.00057266
5	-0.697715	-1.247303	0.00028231	26	0.127325	-0.003476	0.00124195
6	-0.697715	-1.071184	0.00161775	41	0.000000	0.000000	0.00070350
7	-0.697715	-0.750117	0.00244560	42	0.000000	0.000000	-0.00175631
8	-0.697715	-0.292828	0.00267732	43	0.145162	-0.005728	-0.00311818
9	-0.697715	-0.016965	-0.00054631	44	0.143242	-1.071184	-0.00239977
10	-0.699133	-0.737915	-0.00564892	45	0.142130	-1.209152	0.00062731
11	-0.700552	-1.649211	-0.00365546	46	0.139098	-0.006472	0.00206537
12	-0.701970	-1.859402	0.00151801				
13	-0.703388	-1.156474	0.00595546				
14	-0.704806	-0.007843	0.00574083				
21	0.000000	0.000000	0.00033765				

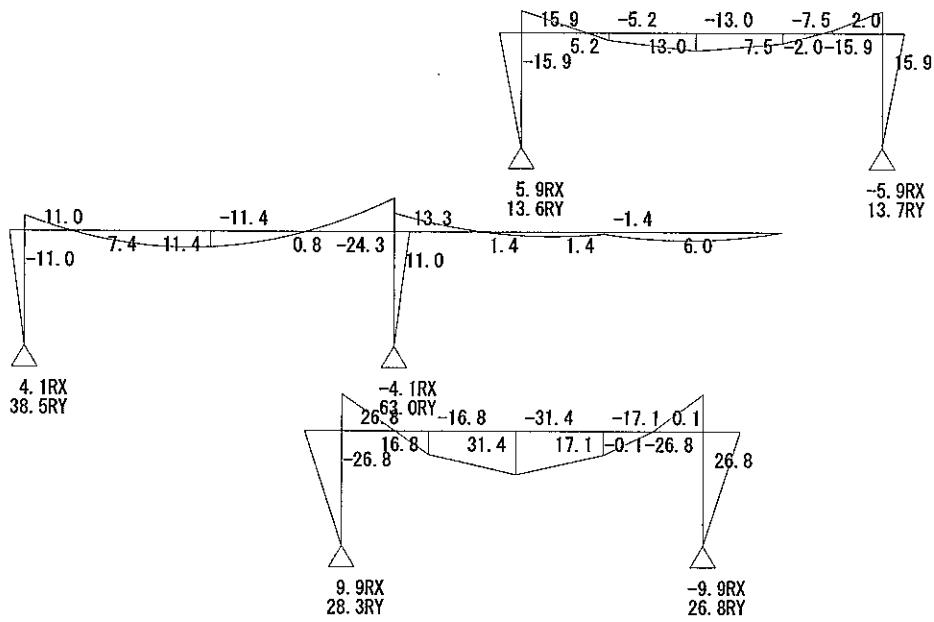
【部材応力】

※※ 荷重ケース 1 ※※ DL

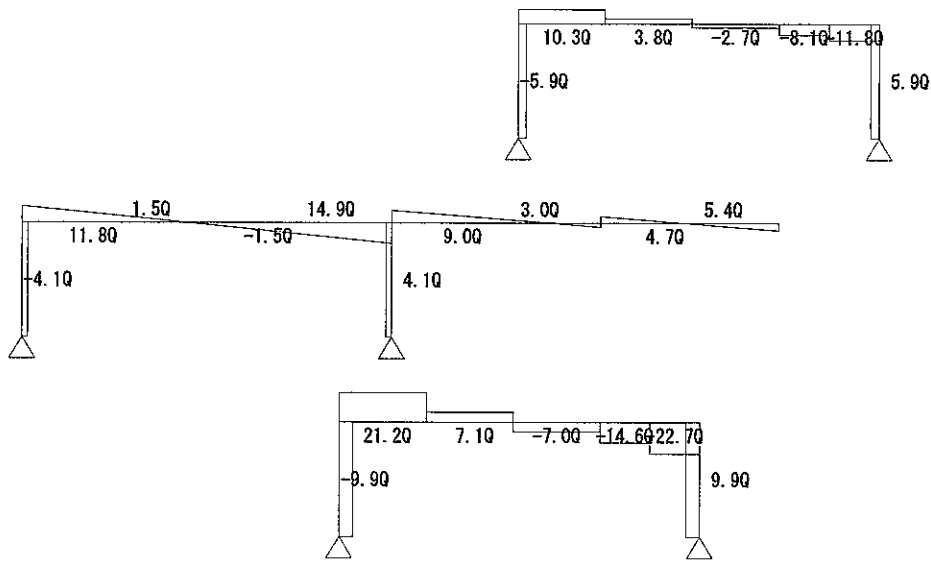
部材No	ノ節点No		M [kNm]			Q [kN]		N [kN]		
	i 端	j 端	i 端	中央	j 端	i 端	j 端	i 端	j 端	
1	1	9	0.0	-12.6	-25.1	-9.3	9.3	76.3	-76.3	
2	2	14	0.0	12.6	25.1	9.3	-9.3	35.3	-35.3	
3	21	23	0.0	-6.9	-13.7	-5.1	5.1	15.9	-15.9	
4	22	26	0.0	6.9	13.7	5.1	-5.1	15.6	-15.6	
5	41	43	0.0	-10.3	-20.7	-7.7	7.7	25.8	-25.8	
6	42	46	0.0	10.3	20.7	7.7	-7.7	29.1	-29.1	
11	3	4	0.0	8.3	16.7	11.1	-11.1	0.0	0.0	
12	4	5	-16.7	17.3	18.0	0.9	-0.9	0.0	0.0	
13	5	6	-18.0	11.0	3.9	-9.3	9.3	0.0	0.0	
14	6	7	-3.9	6.2	8.6	2.8	-2.8	0.0	0.0	

部材No	ノ 節点No /		M [kNm]		Q [kN]		N [kN]		
	i 端	j 端	i 端	中央	j 端	i 端	j 端	i 端	j 端
15	7	8	-8.6	1.7	-5.1	-8.3	8.3	0.0	0.0
16	8	9	5.1	-24.3	-43.6	-23.5	23.5	0.0	0.0
17	9	10	68.7	-36.4	-4.1	37.2	-37.2	9.3	-9.3
18	10	11	4.1	14.2	32.5	21.1	-21.1	9.3	-9.3
19	11	12	-32.5	36.9	41.3	5.0	-5.0	9.3	-9.3
20	12	13	-41.3	31.7	22.0	-11.1	11.1	9.3	-9.3
21	13	14	-22.0	-1.5	-25.1	-27.2	27.2	9.3	-9.3
31	23	24	13.7	3.2	17.8	12.7	-9.4	5.1	-5.1
32	24	25	-17.8	16.1	13.6	-1.6	3.5	5.1	-5.1
33	25	26	-13.6	2.8	-13.7	-3.5	8.6	5.1	-5.1
41	43	44	20.7	3.9	23.7	19.0	-12.2	7.7	-7.7
42	44	45	-23.7	23.0	20.6	0.1	3.8	7.7	-7.7
43	45	46	-20.6	6.0	-20.7	-3.8	14.5	7.7	-7.7

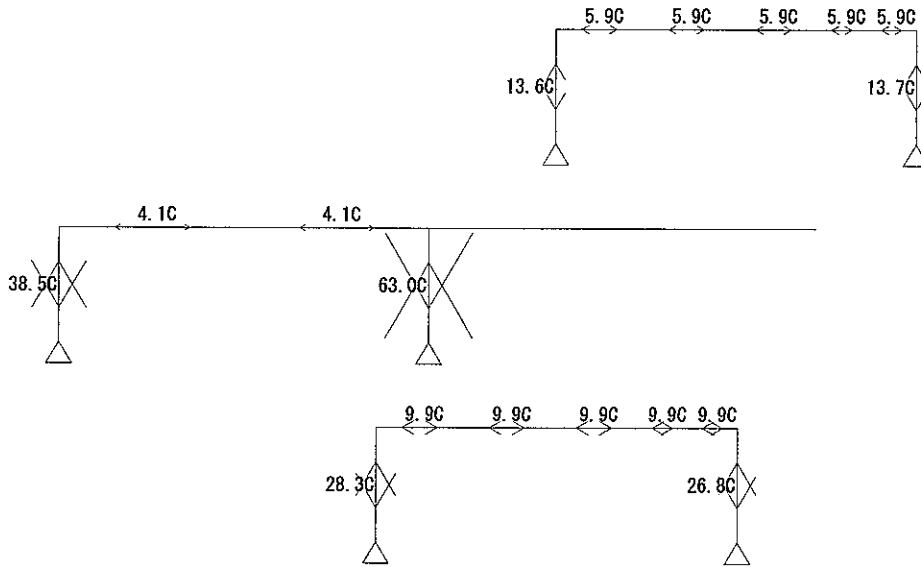
19



28

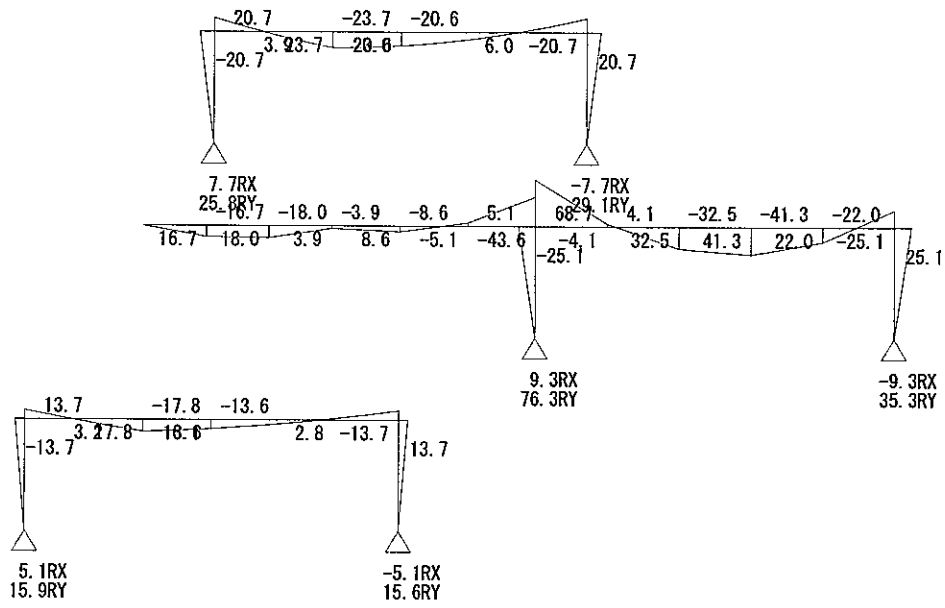


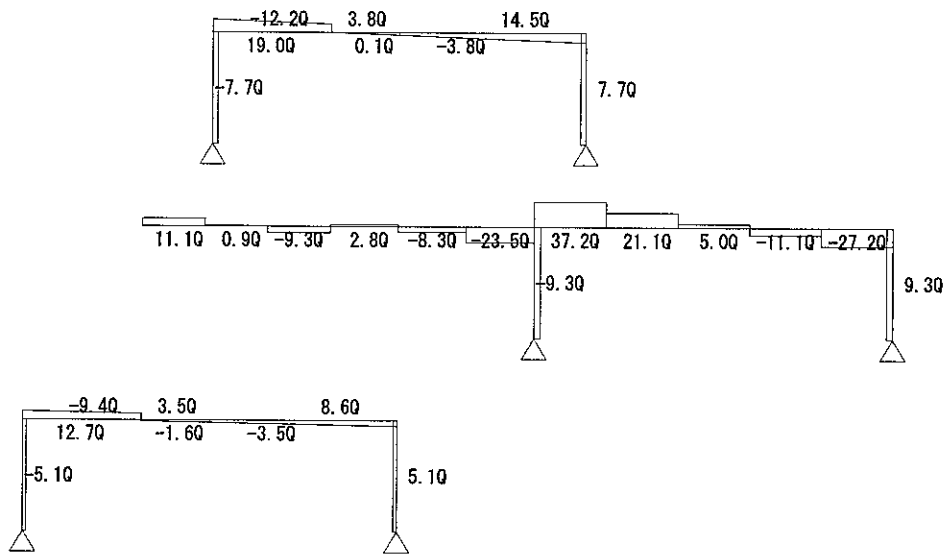


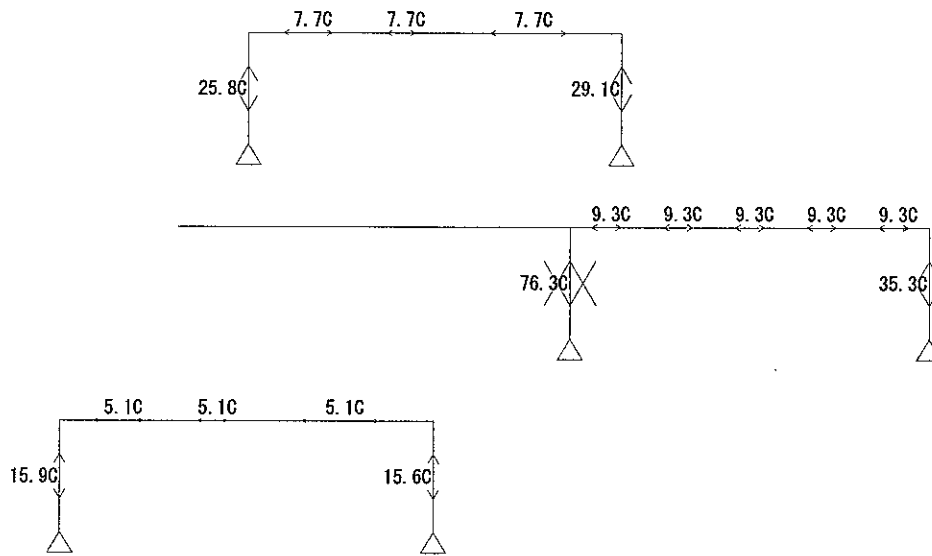


72

SB-21







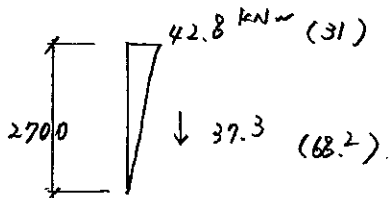
52

SB-24

Member design

< Column >

↓ Ref. SB-5



$H-200 \times 200 \times 8 \quad Z_x = 357 \quad i_y = 7.76 \quad A = 59.24$

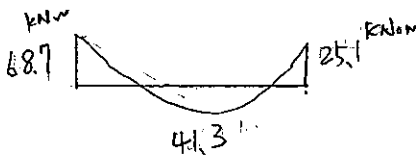
$l_k = 2700 \times 1.5 = 4050 \quad \lambda = 4050 / 77.6 = 53$

$f_c = 133 \text{ N/mm}^2 \quad f_b = 157 \text{ N/mm}^2$

$\sigma_b = \frac{42.8 \times 10^3}{357} = 120 \quad \sigma_b/f_b = 0.77$   
 $\sigma_c = \frac{37.3 \times 10^3}{5924} = 6.3 \quad \sigma_c/f_c = 0.05$   
 }  $(0.82) < 1.0$   
 OK

< Girder >

↓ Ref. SB-22

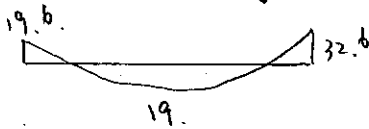


$H-244 \times 175 \times 7 \times 11 \quad Z_x = 495 \quad l_b = 2100$

$f_b = \frac{89000 \times 175 \times 11}{2100 \times 244} = 334 \rightarrow 157$

$\sigma_b = \frac{68.7 \times 10^3}{495} = 139 \quad \sigma_b/f_b = 0.89 < 1.0$   
 OK

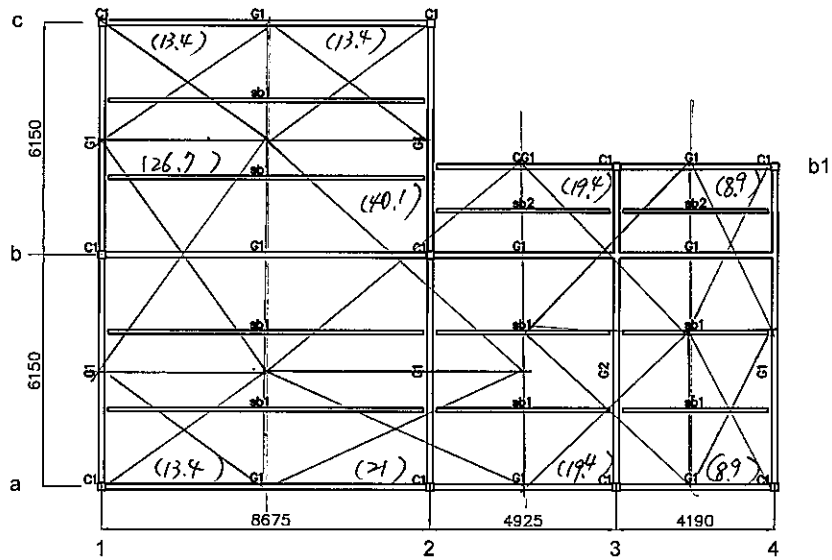
↓ Ref. SB-5



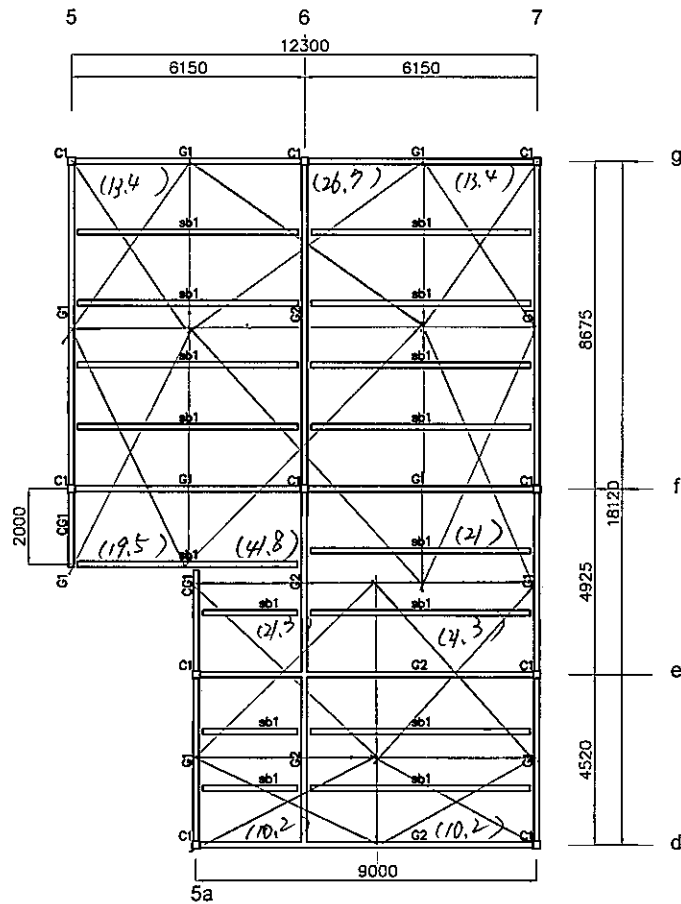
$H-194 \times 150 \times 6 \times 9 \quad Z_x = 271 \quad l_b = 2100$

$\sigma_b = \frac{32.6 \times 10^3}{271} = 121 \quad \sigma_b/f_b = 0.77 < 1.0$   
 OK

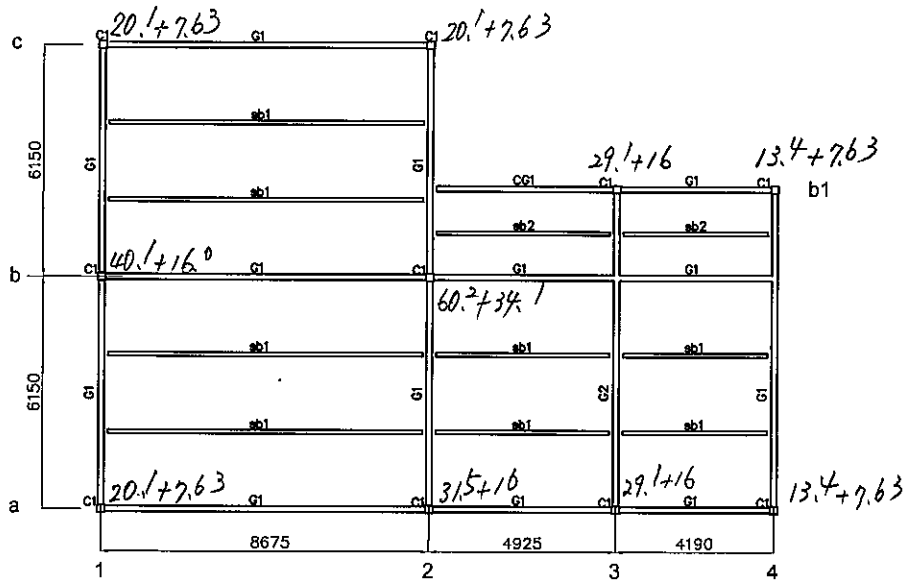
Area



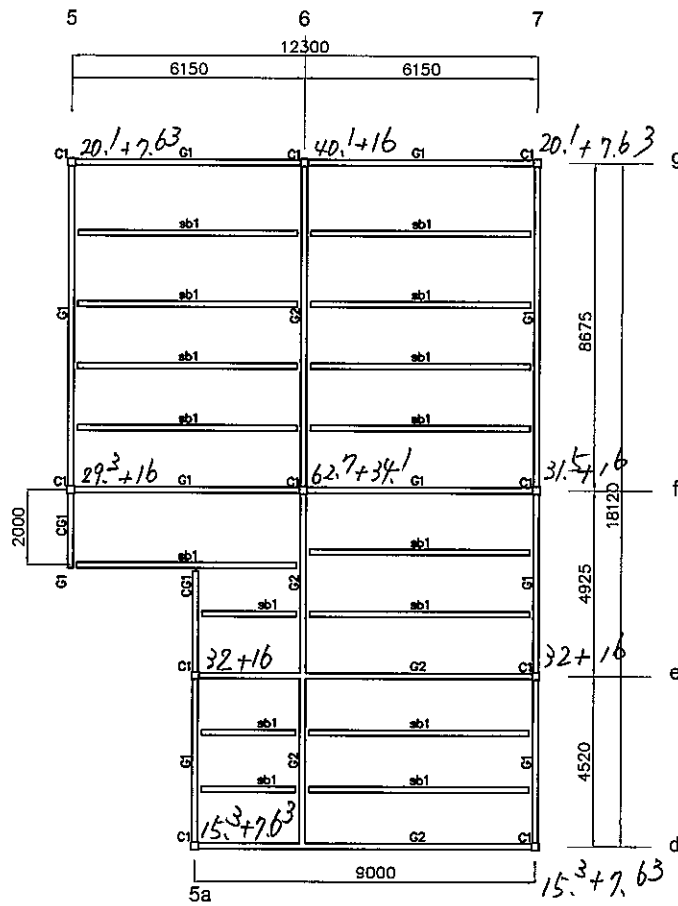
PLAN OF A-STRUCTURE



PLAN OF B-STRUCTURE



PLAN OF A-STRUCTURE



PLAN OF B-STRUCTURE

Wind Load

$$V_0 = 40 \text{ m/sec}$$

$$z_b = 5 \text{ m} \quad k_f = 2.1$$

$$z_g = 450 \text{ m}$$

$$\alpha = 0.2$$

$$\begin{aligned} E_r &= 1.7 \times (H/z_g)^\alpha \\ &= 1.7 \times (36/450)^{0.2} \\ &= 1.03 \end{aligned}$$

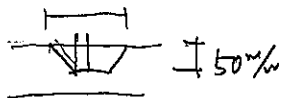
$$\begin{aligned} E &= 1.03^2 \times k_f = 1.03^2 \times 2.1 \\ &= 2.23 \end{aligned}$$

$$\begin{aligned} q &= 0.6 \times E \times V_0^2 \\ &= 0.6 \times 2.23 \times 40^2 = 2141 \Rightarrow 2200 \text{ N/m}^2 \end{aligned}$$

$$\text{self weight} = 1500 \text{ N/m}^2$$

$$\text{up Lift} = 2.2 - 1.5 = 0.7 \text{ kN/m}^2$$

M20 Anchor



$$A_c \quad \text{[ } 50+50+20=120 \quad A_c = 6^2 \times \pi = 113 \text{ cm}^2$$

$$P_d = 0.75 \times \sqrt{210 \times 113} = 115 \text{ kg} \times 9.8 = 1127 \text{ N} \rightarrow 1120 \text{ N}$$

$$8 \text{ - M20} = 1.12 \times 8 = 8.96 \text{ kN}$$

Foundation self weight

$$1.0 \times 1.0 \times 0.6 \times 24 = 14.4 \text{ kN}$$



$$\text{Area } 28 \text{ m}^2 \times 0.7 = 19.6 \text{ kN}$$

$$\text{Foundation } 0.65^2 \times \pi \times 0.5 \times 24 = 16.0 \text{ kN}$$

Anchor

8 kN

} 24.0 kN

$$24.0 / 1.2 = 20 \text{ kN}$$

$$20 / 0.7 = 28.6 \text{ m}^2$$

$$\text{Area } 14.6 \times 0.7 = 10.3 \text{ kN}$$

$$\text{Foundation } 0.45^2 \times \pi \times 0.5 \times 24 = 7.63$$

Anchor

8

} 15.63

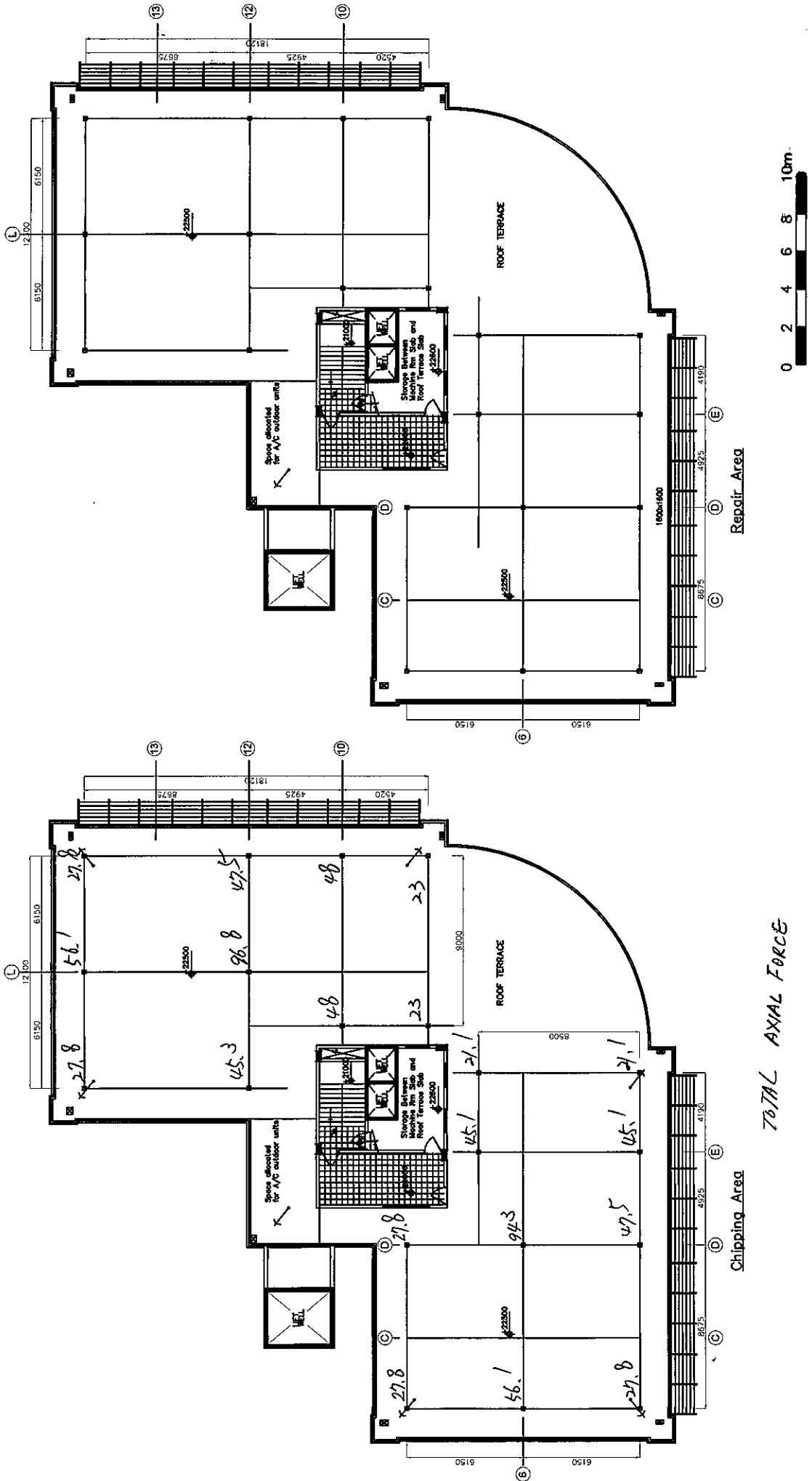
$$\text{Area } 41.8 \times 0.7 = 29.3 \text{ kN}$$

$$\text{Foundation } 0.95^2 \times \pi \times 0.5 \times 24 = 34.0$$

Anchor

8

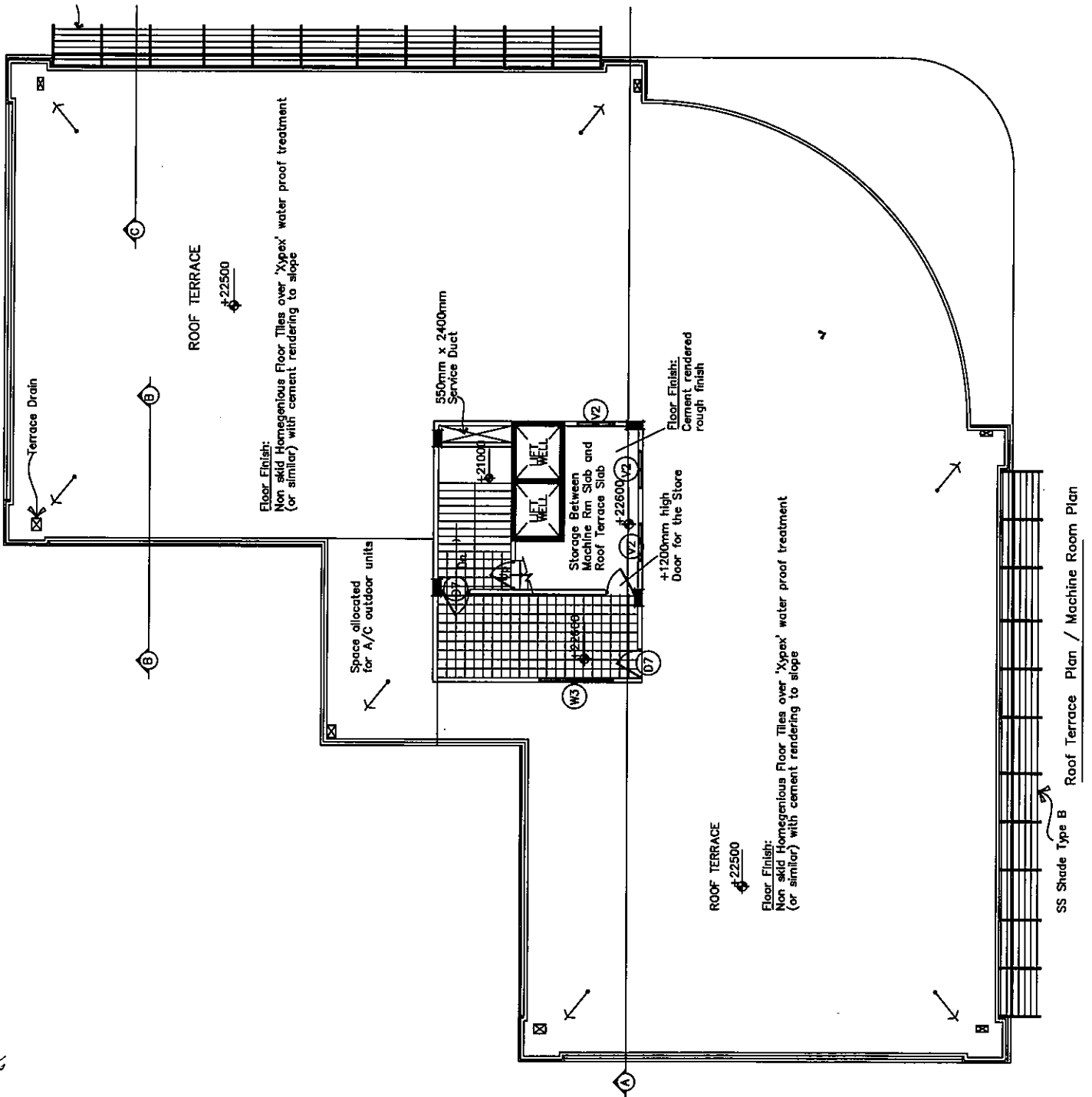
} 42.0

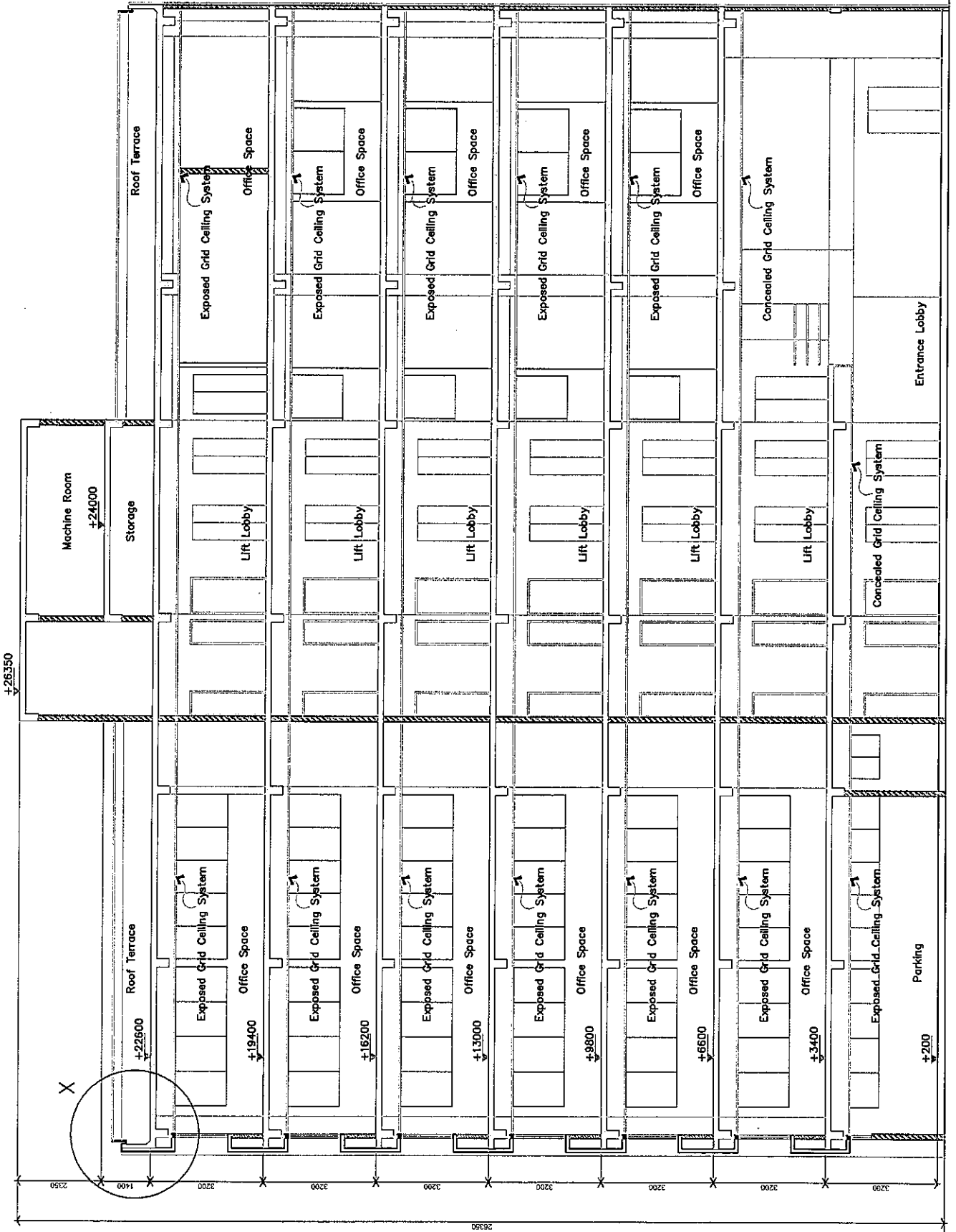


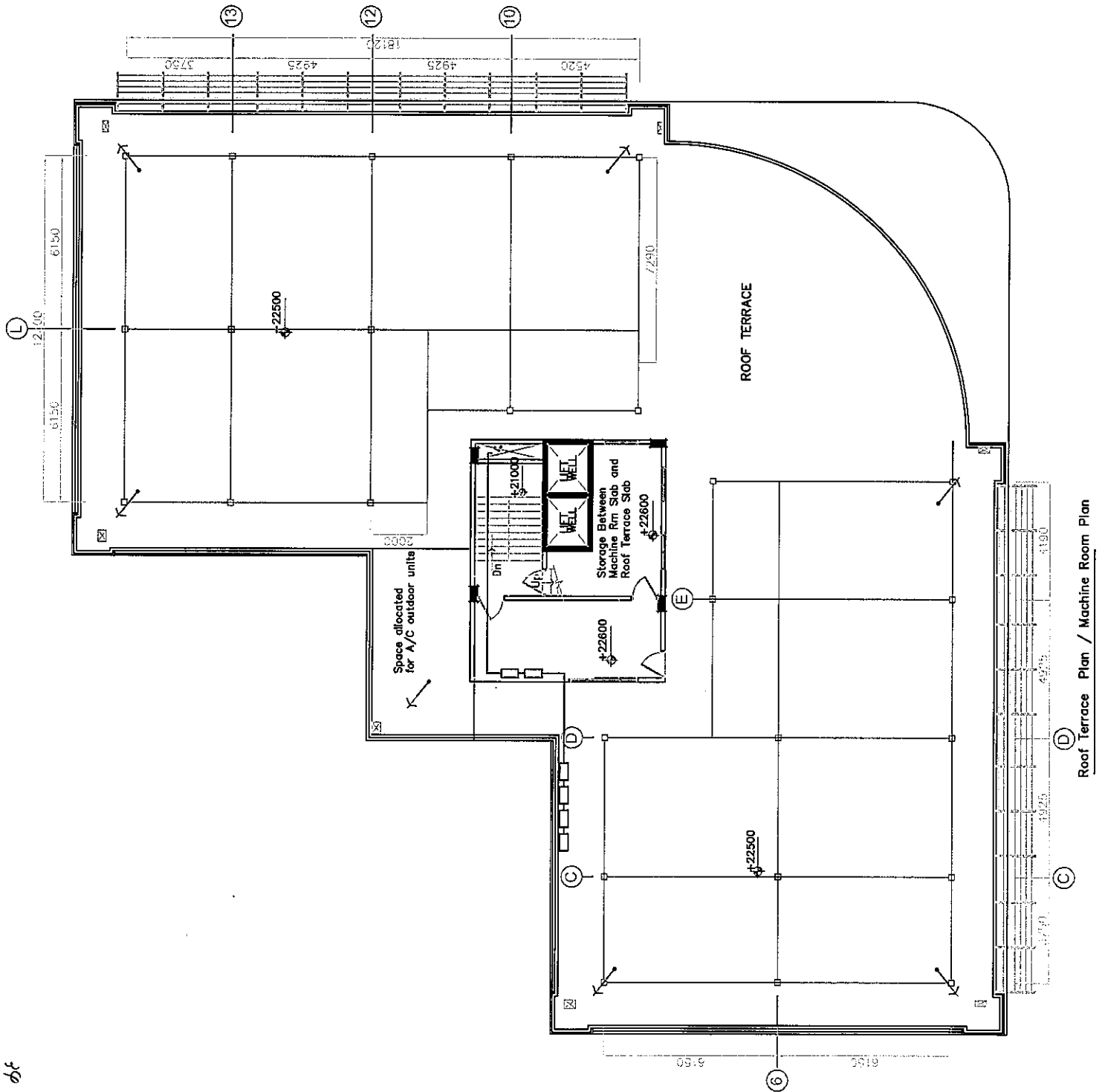
TOTAL AXIAL FORCE

2. 既存建物安全性の確認

The confirmation of the existent building safety

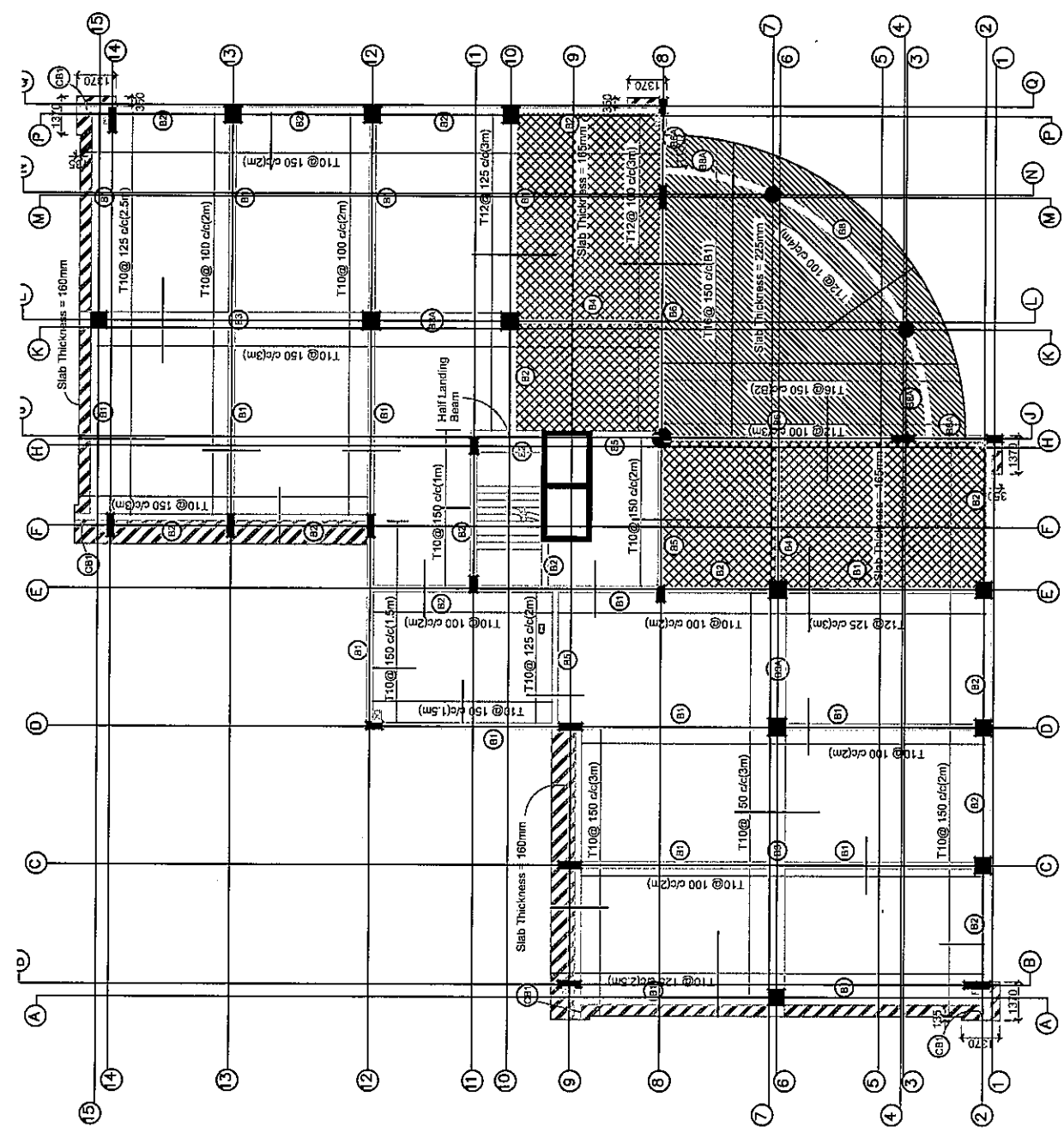






Roof Terrace Plan / Machine Room Plan

68



ROOF TERRACE SLAB BEAM PLAN  
Scale 1:200

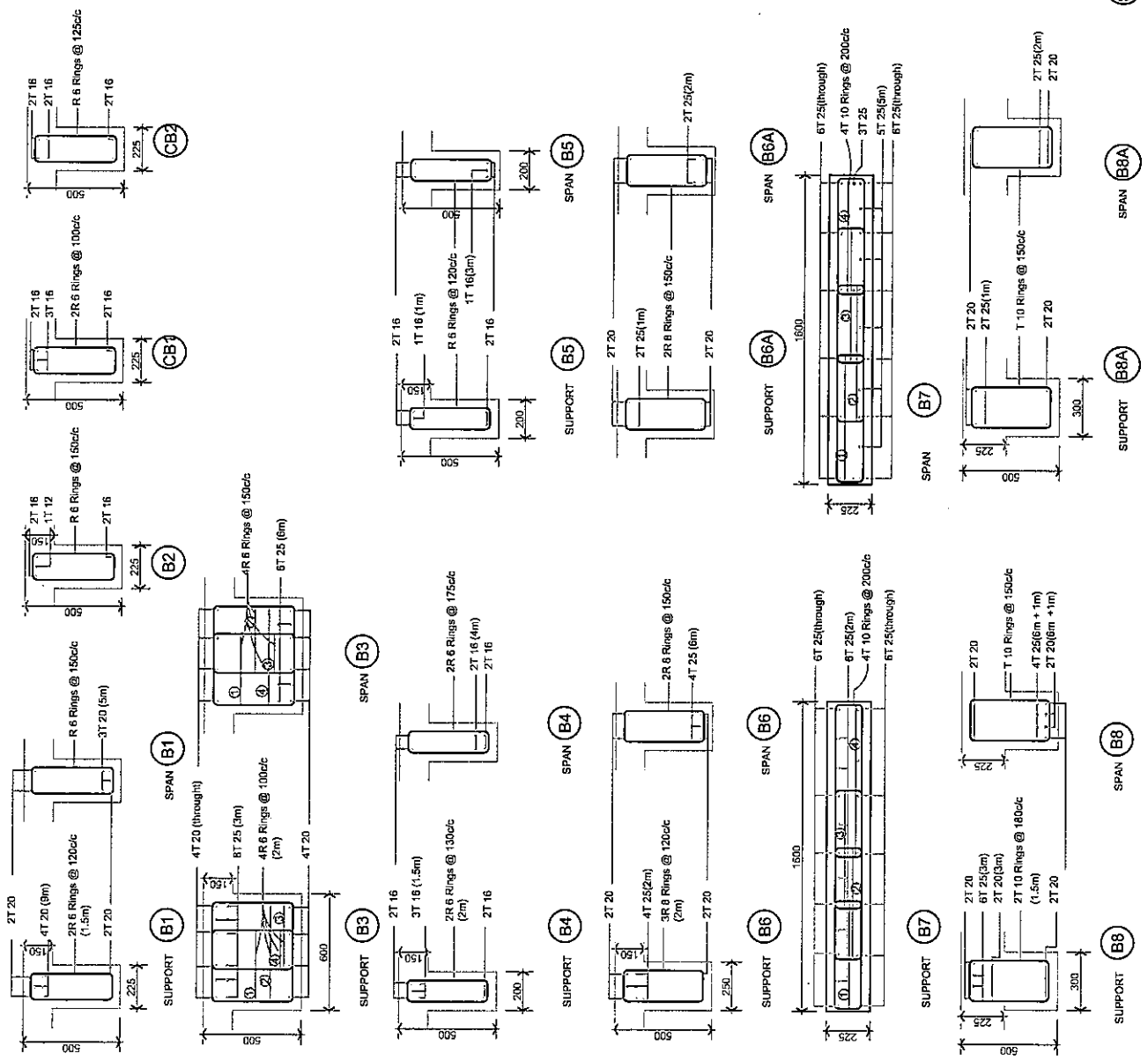
- Note : -
- Slab Thickness = 150mm unless otherwise stated
  - Top Reinforcement as shown
  - Bottom reinforcement
  - T10 @ 150 c/c b/w bottom ( not shown)

st

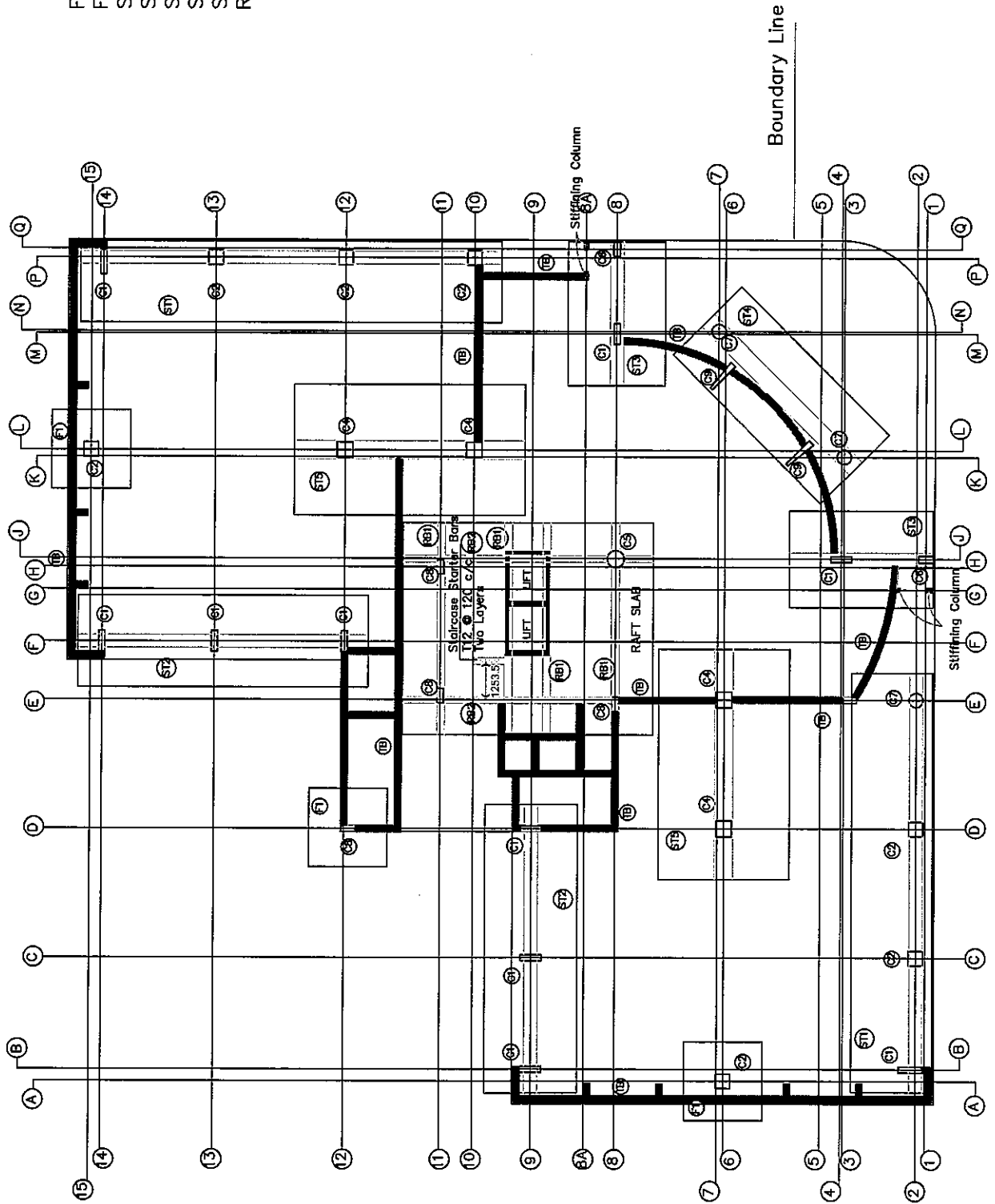
SB-34

**SLAB BEAM DETAILS**

SCALE 1:20



- F1 = 3000 X 3000 X 550
- F2 = 1500 X 1500 X 550
- ST1 = 3100 X 16000 X (varies)
- ST2 = 3500 X 11000 X (varies)
- ST3 = 3700 X 5500 X (varies)
- ST4 = 3700 X 8000 X (varies)
- ST5 = 5000 X 8800 X (varies)
- RAFT SLAB = 8100 X 9500 X 450



FOUNDATION PLAN  
Scale 1:200



# For. Roof STRUCTURE (Beam)

resistance shear force

$$Q_{R} = b \cdot j \cdot \left\{ f_s + 0.5 w f_k \cdot (p_w - 0.002) \right\}$$

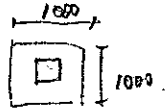
$$\frac{0.73 \times 2}{25^m \times 15^m} = 0.0038$$

$$\frac{28.3 \times 2}{225 \times 120} = 0.00209$$

$$Q_{R} = 225 \times 225 \times \frac{7}{8} \times (0.71 + 0.5 \times 195 \times (0.00209 - 0.002))$$

$$= 63.6 \text{ kN.}$$

for. Slab.



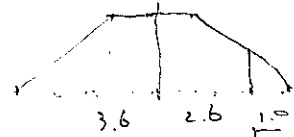
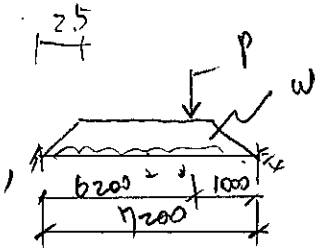
$$t = 120, B = 4000$$

$$A_c = 120 \times 4000 = 480,000 \text{ mm}^2$$

$$Q = 48 \text{ kN}$$

(Ref. SB-30)

$$\tau = \frac{48 \times 10^3}{480,000} = 0.1 \text{ N/mm}^2 < 0.71$$



$$P = 48 \text{ kN}$$

$$W = 6.7 \times 4.925 = 33 \text{ kN/m}$$

$$q = 0.225 \times 0.35 \times 224 = 1.89 \text{ kN/m}^2$$

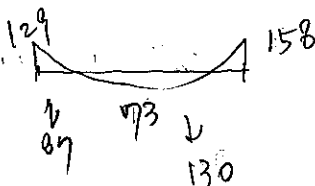
$$2.5 = 33$$

$$1.0 = 13.2$$

SLAB	150	360
Mortar	80	160
water proof		15
ceiling		20

$$555 + 130 = 685$$

$$\rightarrow 6.7 \text{ kN/m}^2$$



$$\frac{156 \times 10^6}{128 \times 11^3 \times 45}$$

$$\textcircled{B1}$$

$$22.5 \times 50$$

$$a_t = \frac{156 \times 10^6}{215 \times 393.7} = 1867 < 6-D20 \text{ E } (1884)$$

$$a_t = \frac{73 \times 10^6}{215 \times 393} = 864 < 5-D20 \text{ (1590)}$$

OK

$$p = \frac{a_t}{b \cdot e}$$

【基本事項・計算条件】

工 事 名 : モデル 検討  
略 称 : BEAM  
日 付 : 2009/10/20  
担 当 者 : YEC

- せん断による変形の考慮 : する
- 剛域の考慮 : する
- 伸縮しない材 (Aを1000倍) : 有
- 節点同一変位の指定 : 有
- 部材毎の増減率の考慮 : 有
- パネ材の使用 : しない
- 結合状態の共通指定 : 部材毎に指定
- 応力着目点の追加 : しない
- 接合部パネ 軸変形の考慮 : しない
- 剛域・パネ 軸変形の考慮 : しない
- 剛域を考慮した固定端モーメントの計算 : しない
- 部材端と節点のスレ : 無
- 分布パネ : 無

・出力単位 : S I 単位

【節点座標】 [m]

No	X 座標	Y 座標
1	0.000	0.000
2	3.600	0.000
3	6.200	0.000
4	7.200	0.000

【支点データ】 [kN/cm] [kNm/rad] (0は自由、1は拘束を表します。)

No	ノードNo.	X方向バネ	Y方向バネ	回転バネ
1	1 4	1.0	1.0	1.0

【材質】 [kN/mm<sup>2</sup>]

No	E	G
1	21.00	9.00

【断面性能】

No	A [cm <sup>2</sup> ]	I [cm <sup>4</sup> ]	κ	断面名
1	1125.00	234375	1.20	B*D-22.5*50

【部材配置】 (断面No. が負値の材は、伸縮しない材を表します。)

No	ノードNo.		断面No.	材質No.	結合No.		剛域 [cm]		曲げ	増減率	
	i 端	j 端			i 端	j 端	i 端	j 端		軸方向	せん断
1	1	2	1	1	0	0	0.0	0.0	2.000	1.000	1.000
2	2	3	1	1	0	0	0.0	0.0	2.000	1.000	1.000
3	3	4	1	1	0	0	0.0	0.0	2.000	1.000	1.000

【荷重ケース 1】 DL+LL

No	ノードNo.			TYPE	方向	P 1	P 2	P 3	P 4	P 5	P 6
	<1>	<2>	<3>								
1	1	~	3	4	0	1.890kN/m					
2	1			7	1	0.000kN/m	33.000kN/m	0.000m	1.100m		
3	1			7	1	33.000kN/m	33.000kN/m	2.500m	0.000m		
4	2			7	1	33.000kN/m	33.000kN/m	0.000m	1.500m		
5	2			7	1	33.000kN/m	13.200kN/m	1.100m	0.000m		
6	3			7	1	13.200kN/m	0.000kN/m	0.000m	0.000m		
7	3			0		0.000kN	-48.000kN	0.000kNm			

【支点反力】

※※ 荷重ケース 1 ※※ DL+LL

節点No	Rx [kN]	Ry [kN]	Rm [kNm]
1	0.0	87.0	128.4
4	0.0	129.7	-157.6
合計	0.0	216.7	-29.2

【節点変位】

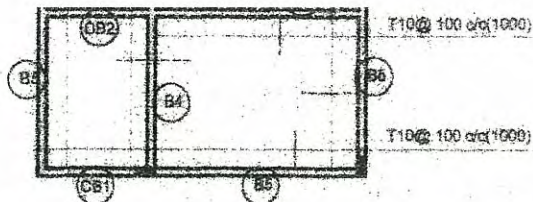
※※ 荷重ケース 1 ※※ DL+LL

節点No	$\delta x$ [cm]	$\delta y$ [cm]	$\theta$ [rad]
1	0.000000	0.000000	0.00000000
2	0.000000	-0.263787	-0.00004980
3	0.000000	-0.073303	0.00095072
4	0.000000	0.000000	0.00000000

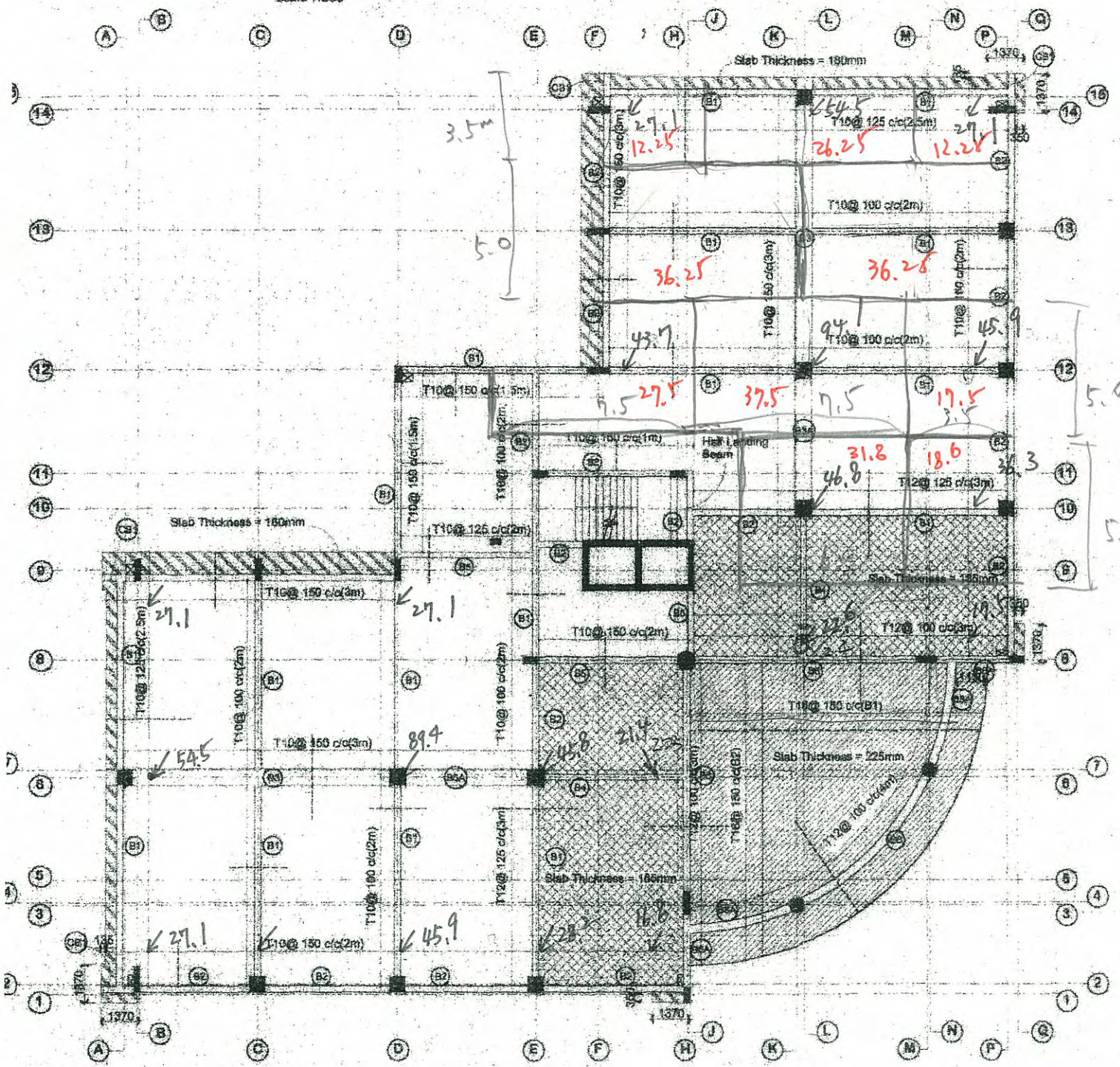
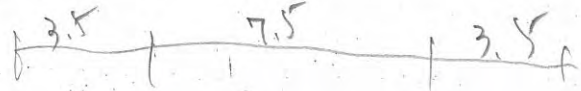
【部材応力】

※※ 荷重ケース 1 ※※ DL+LL

部材No	ノ 節点No ノ		M [kNm]		Q [kN]		N [kN]	
	i 端	j 端	i 端	中央	i 端	j 端	i 端	j 端
1	1	2	128.4	12.3	72.7	87.0	-2.6	0.0
2	2	3	-72.7	46.7	-31.0	2.6	73.3	0.0
3	3	4	31.0	-93.2	-157.6	-121.3	129.7	0.0



Slab Thickness = 150mm  
**MACHINE ROOM SLAB BEAM PLAN**  
 Scale 1:200



**ROOF TERRACE SLAB BEAM PLAN**  
 Scale 1:200

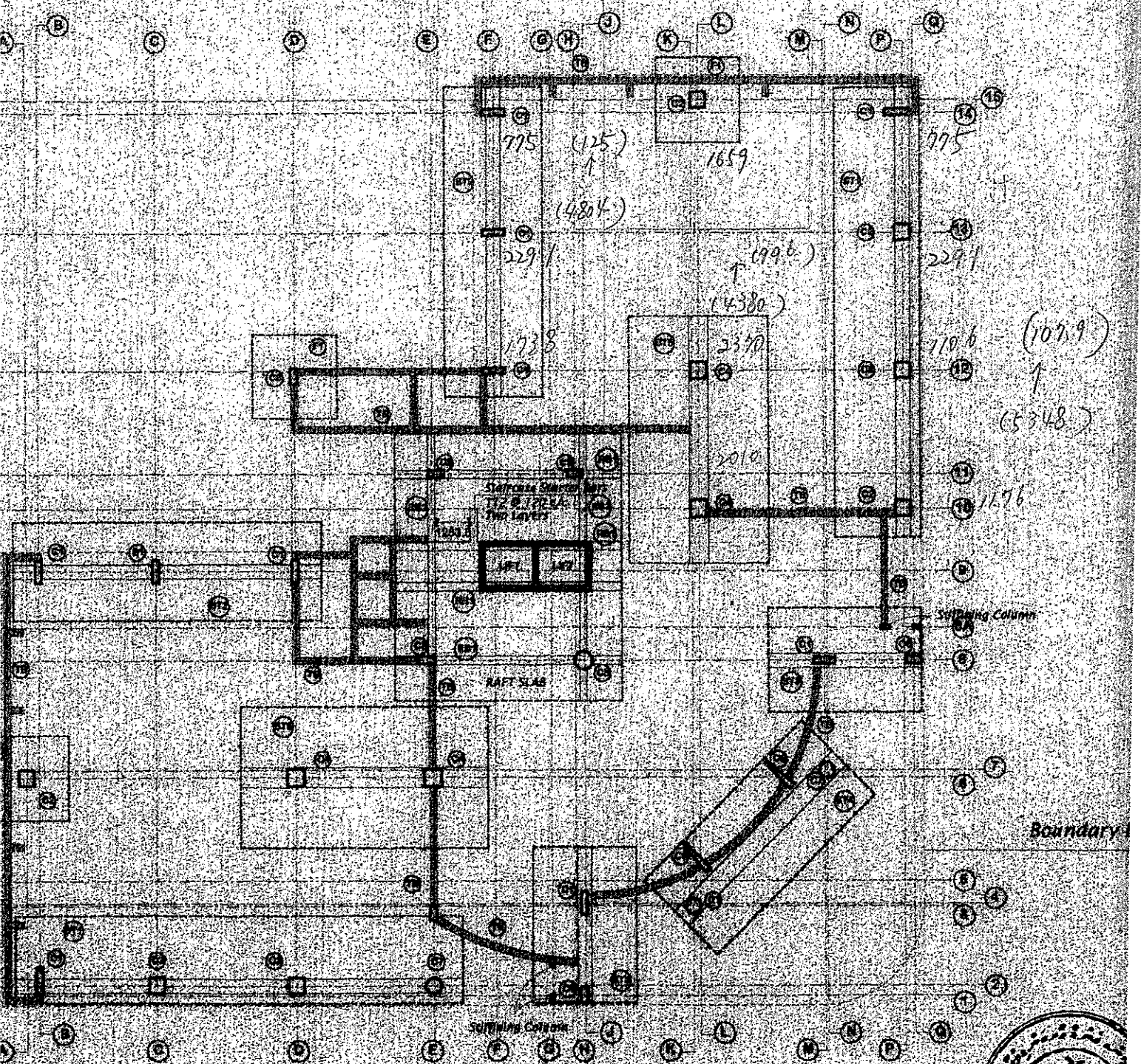
Note :-  
 Slab Thickness = 150mm unless otherwise stated  
 Top Reinforcement as shown  
 Bottom reinforcement  
 T10@150 c/c (not shown)

Average unit weight

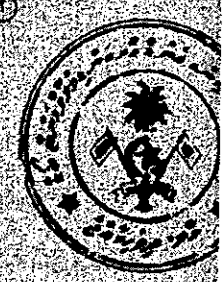
$12.25 \text{ m}^2$	$\times 7.9 \text{ kN/m}^2$	$\times 8^{\text{Floor}}$	$= 775 \text{ kN}$
26.25	$\times$	"	$= 1659 \text{ kN}$
36.25	$\times$	"	$= 2291 \text{ kN}$
27.5	$\times$	"	$= 1738 \text{ kN}$
37.5	$\times$	"	$= 2370 \text{ kN}$
17.5	$\times$	"	$= 1106 \text{ kN}$
31.8	$\times$	"	$= 2010 \text{ kN}$
18.6	$\times$	"	$= 1176 \text{ kN}$

No. 1

(185)



FOUNDATION PLAN  
Scale 1:200



REVISIONS	DESIGN	LR	JOB NO.	21644	ENG. NO.
	STRUCT. DESIGN	LS	SCALE	1:200	
	DRAWN		FILE NO.	SP-COMMERCIAL	
	CHECKED		DWA. NO.	DWR12	

ST-01

Ⓕ Line.

$$(4804 + 27.8 + 45.3) = 4878 \text{ kN}$$

$$\text{ST 2 } 3.5 \times 11.0$$

$$4878 / 38.5 = 126.7 \text{ kN/m}^2$$

$$(157) < 250 \text{ kN/m}^2$$

O.K.

Ⓖ Line.

$$(1659 + 56.1) = 1716 \text{ kN}$$

$$\text{F1 } 3.0 \times 3.0$$

$$1716 / 9 = 190.7 \text{ kN/m}^2$$

$$(221) < 250 \text{ kN/m}^2$$

Ⓖ Line.

$$(4380 + 96.8 + 48.0) = 4525$$

$$\text{ST 5 } 5.0 \times 8.8$$

$$4525 / 44 = 102.9 \text{ kN/m}^2$$

$$(133) < 250$$

O.K.

Ⓖ Line

$$(5348 + 27.1 + 47.5 + 48) = 5470.6$$

$$\text{ST 1 } 3.1 \times 16.0$$

$$5470.6 / 49.6 = 110.3 \text{ kN/m}^2$$

$$(141) < 250$$

O.K.

$$\underline{20 \times 1.5 = 30 \text{ kN/m}^2}$$

O.K.

No. 6 Kalaafaanu School

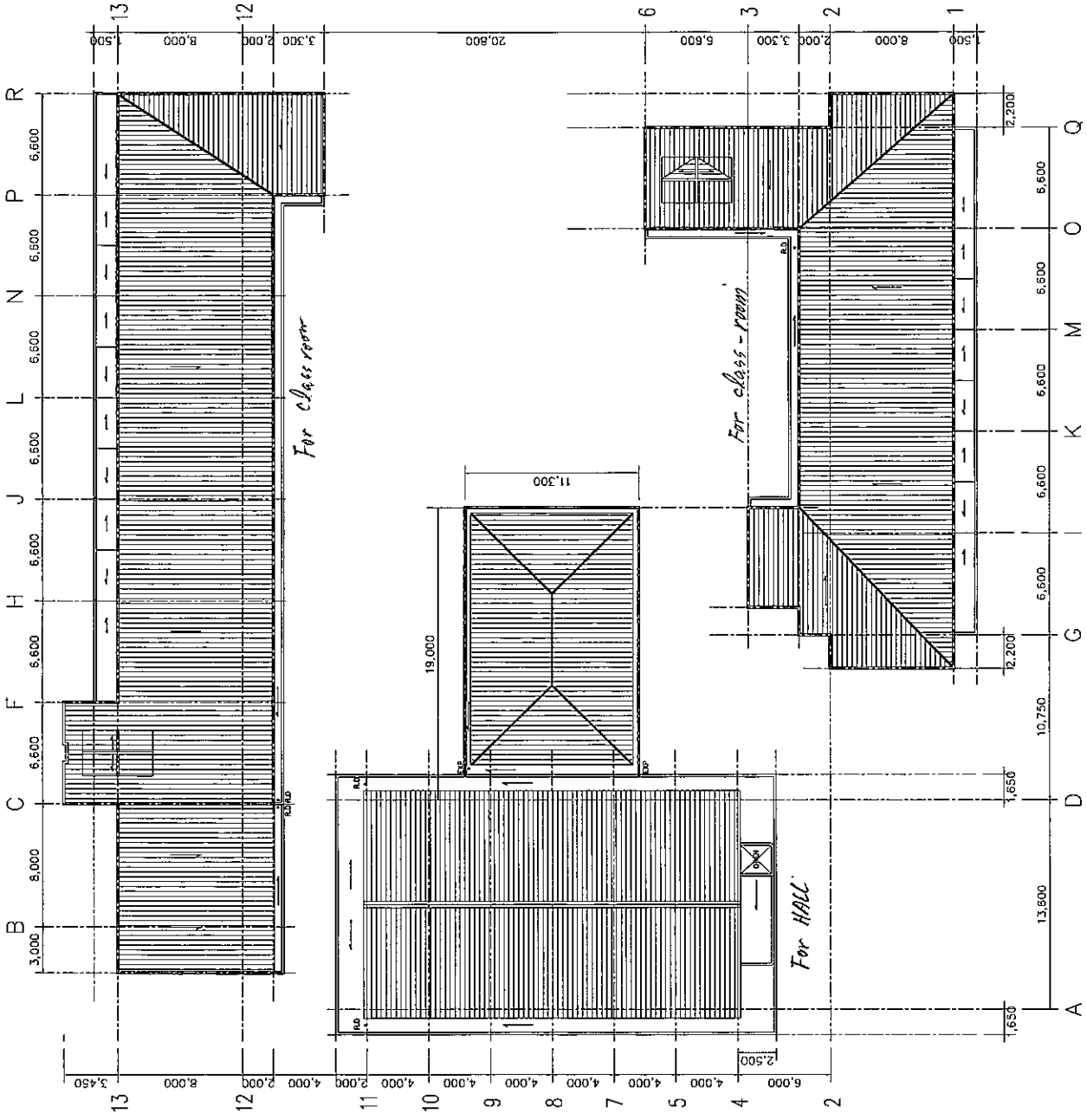
No. 8 Thaaजूddeen School

No. 9 New Secondary School for Girls.



- PV パネルと受け材の重量を  $0.5 \text{ kN/m}^2$  とする。
- 受け材を新規に設計する。
- 既存は母屋、束、小梁、トラス材を確認する。
- 主要構造部材は追加重量が  $0.5 \text{ kN/m}^2$  なので安全性に問題はない。

No. 6 Kalaafaanu School



Roof plan

KTN-1

S=1:300

KTN-1

6 Kalaafaanu School

2. 12S13P 156pcs 32.76kW

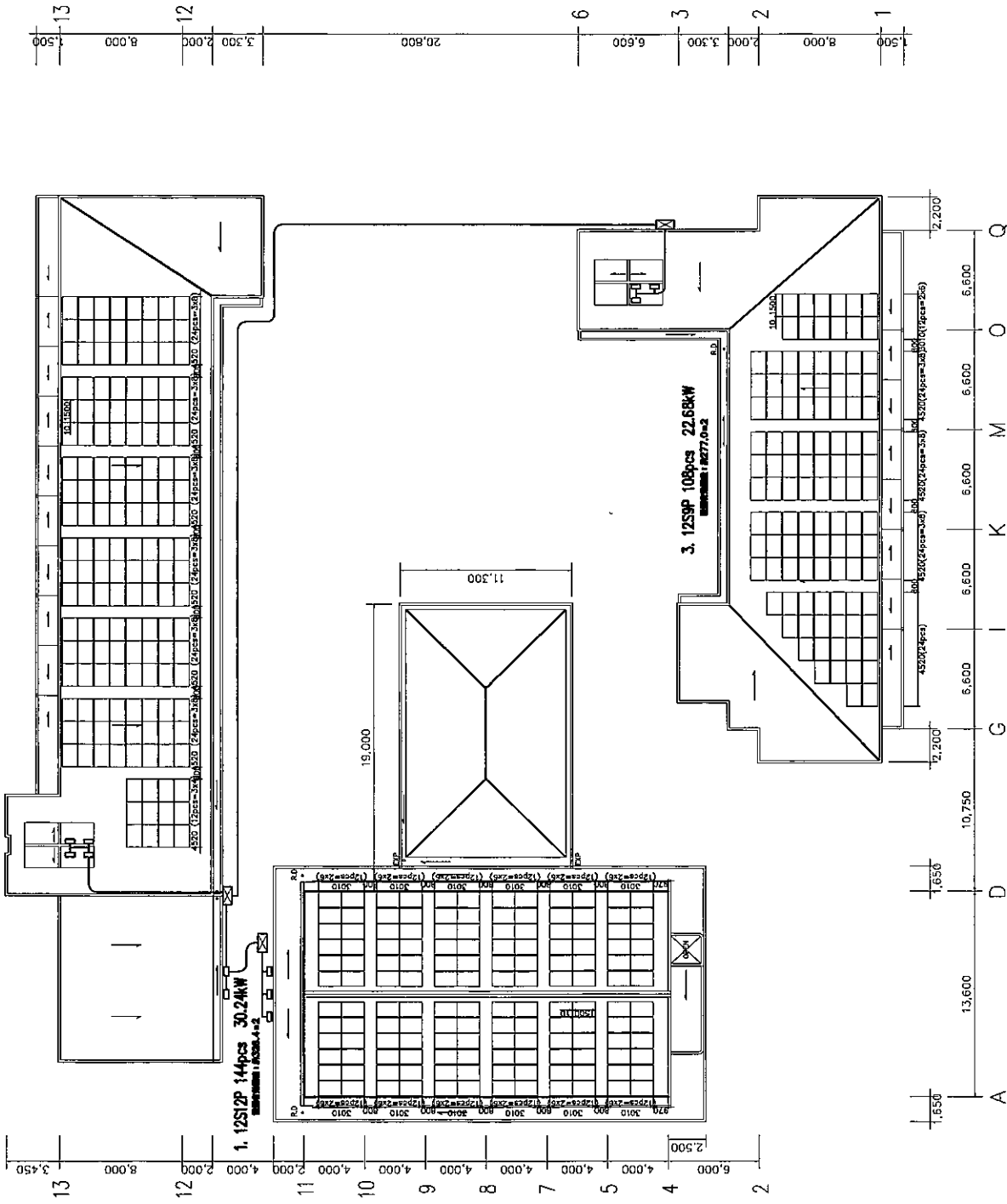
Module: 1000x1750

1. 12S12P 144pcs 30.24kW

Module: 1000x1750

3. 12S9P 108pcs 22.68kW

Module: 1000x1750



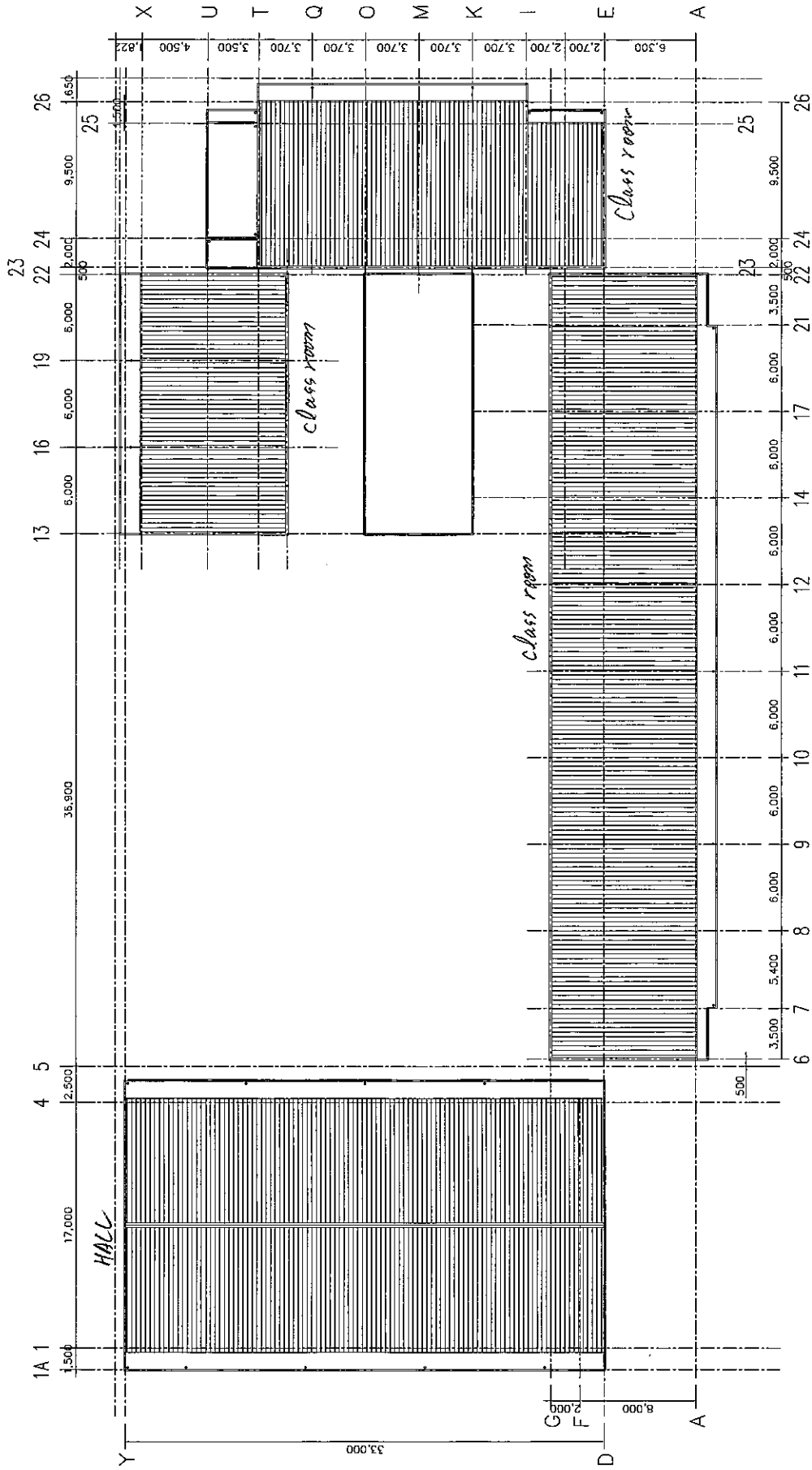
PV PANEL PLAN

KTN-2

S=1:300

KTN-2

No. 8 Thaaajuddeen School



Roof Plan

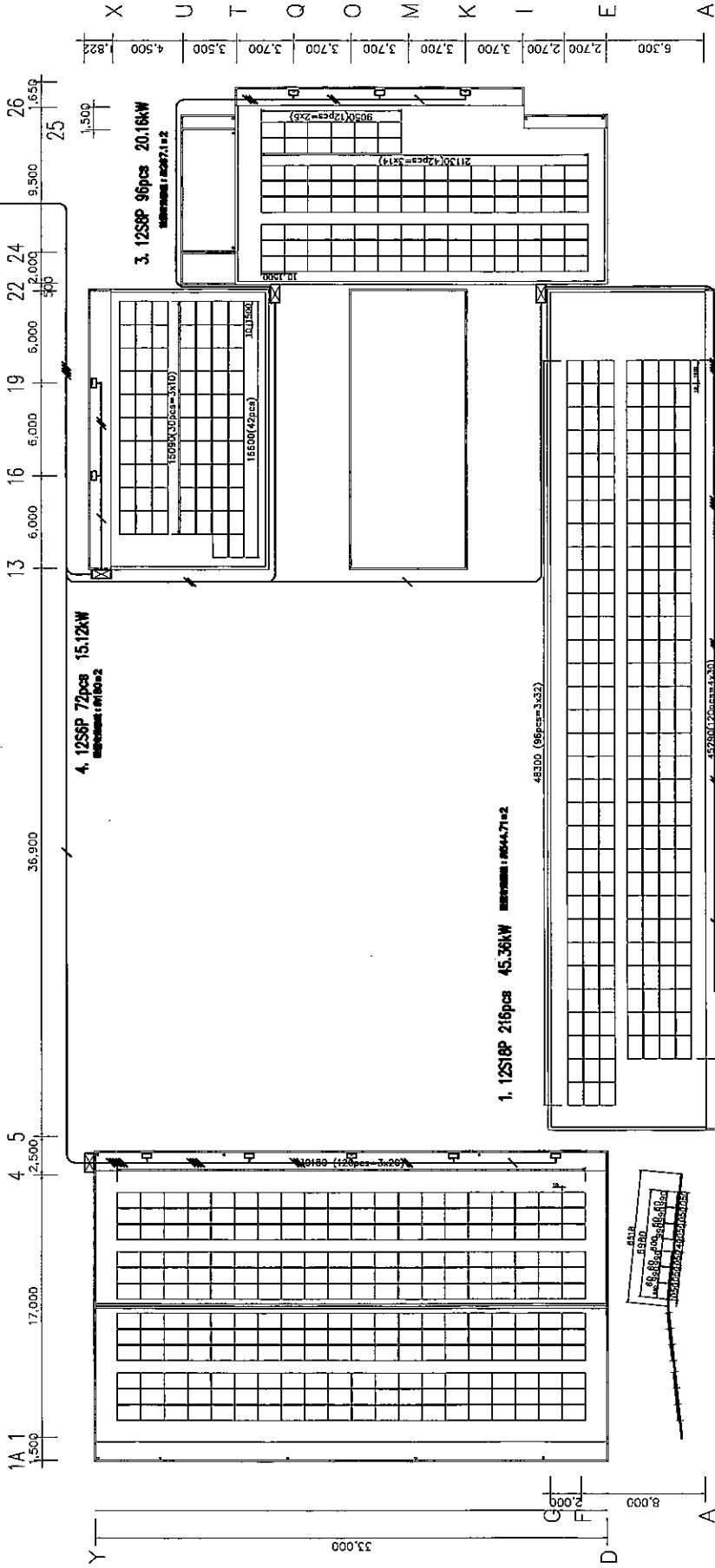
KTN-3

S=1:300

KTN-3

8 Thajuddeen School

2. 12S1P 240pcs 50.40kW MEMORANDUM : 16060.82x2



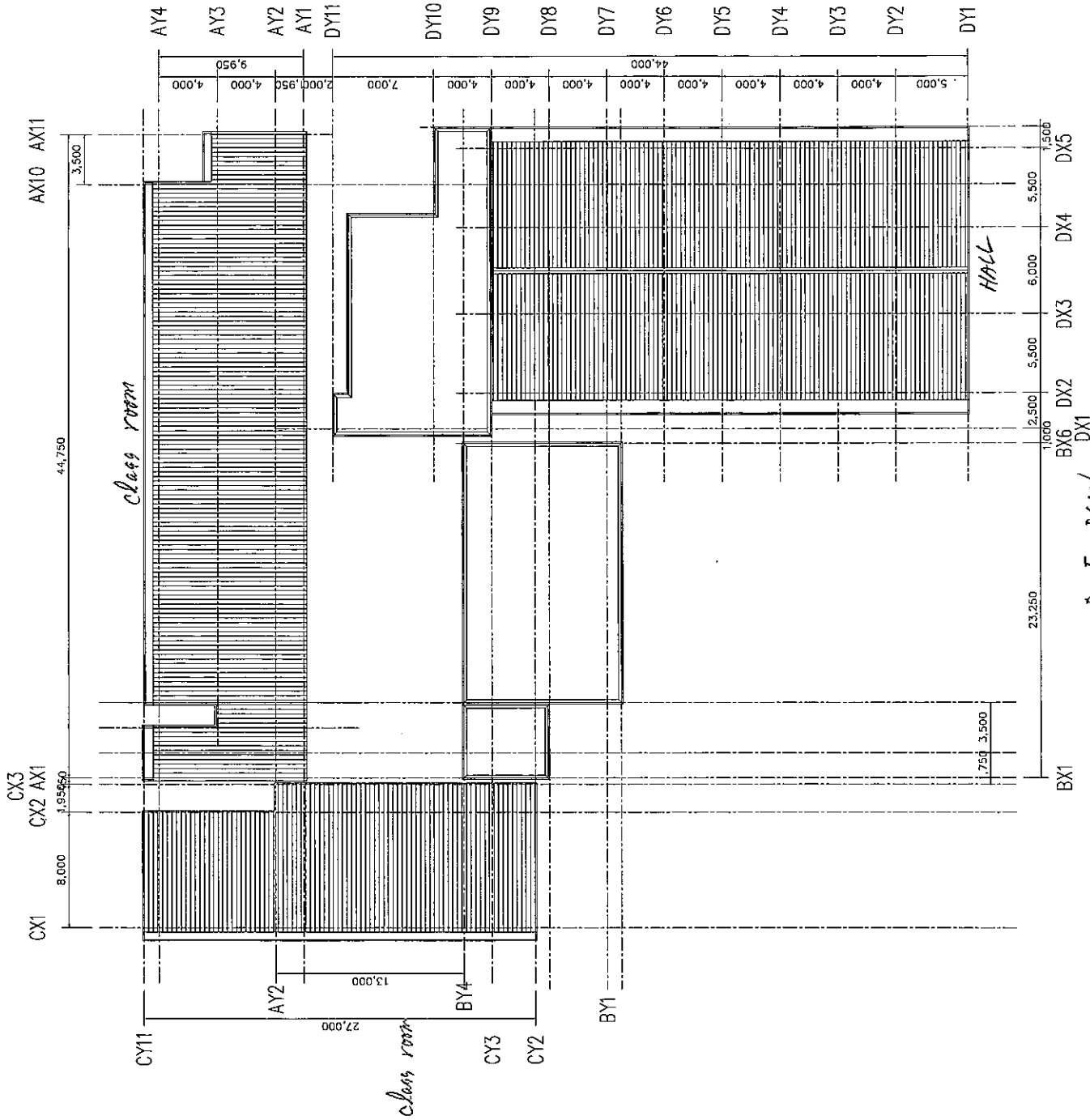
PU PANGKAL PLAN

KTN-4  
S=1:300

KTN-4

64

No. 9. New Secondary School for Girls

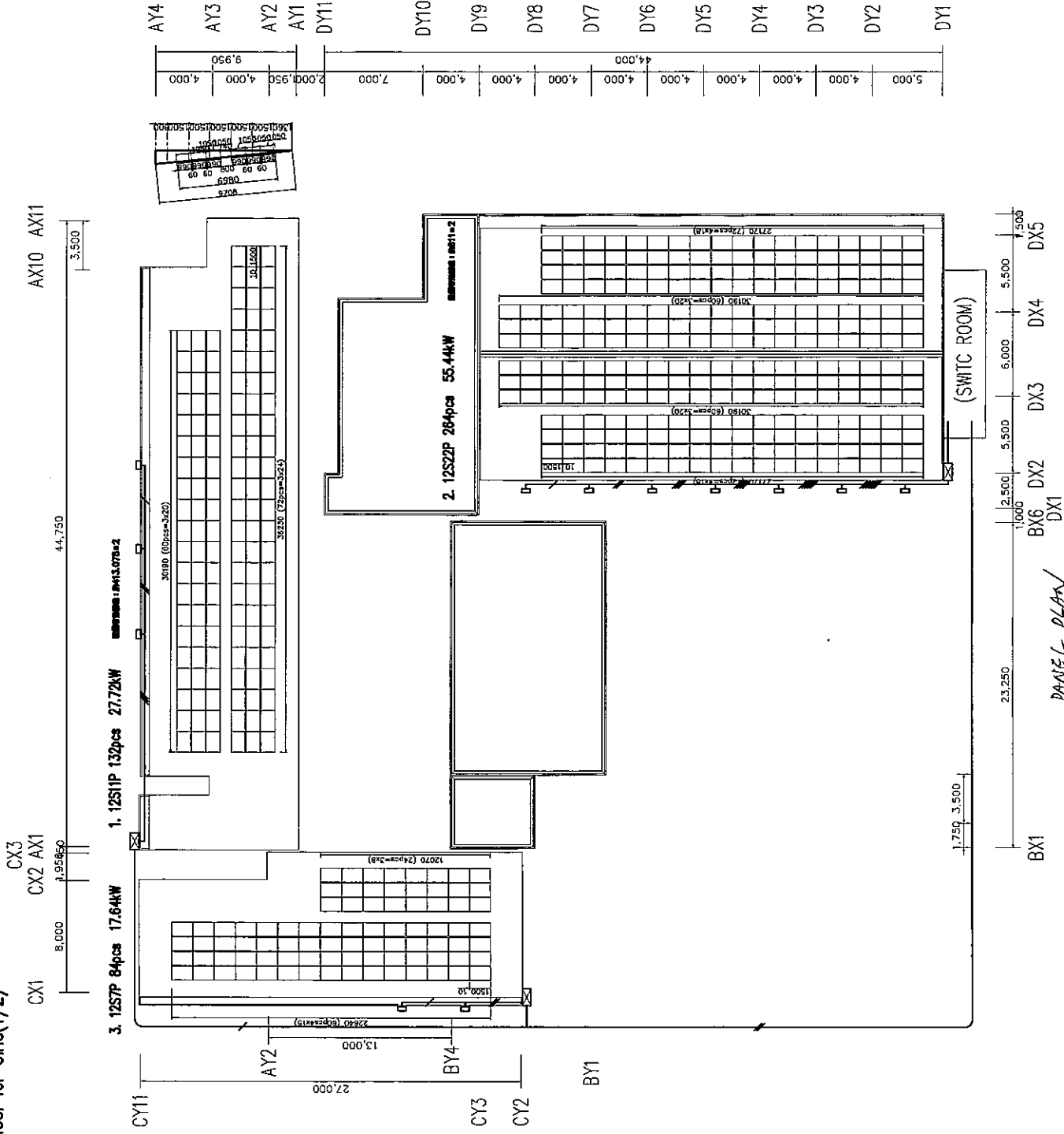


KTN-5  
S=1:300

Roof PLAN

KTN-5

### 9 New Secondary School for Girls(1/2)



## Rough Weight of PV Panel

Site	Capacity of PV UNIT		ITEM	Unit Weight	Unit	Piece or m	Weight	Area	unit load		
No 6	School Hall	30.24	kW	PV Panel	30.5	kg/p	144	4392.0	kg	228.31	30.6
				Base Channel	10.3	kg/m	252.84	2604.3	kg		
				Sub Total					6996.3		
	North Class room	32.76	kW	PV Panel	30.5	kg/p	156	4758.0	kg	247.34	30.3
				Base Channel	10.3	kg/m	266.68	2746.8	kg		
				Sub Total					7504.8		
	South Class room	22.68	kW	PV Panel	30.5	kg/p	108	3294.0	kg	171.23	30.5
				Base Channel	10.3	kg/m	186.82	1924.2	kg		
				Sub Total					5218.2		
Total Capacity of PV		85.68	kW								

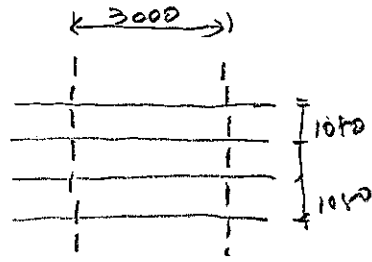
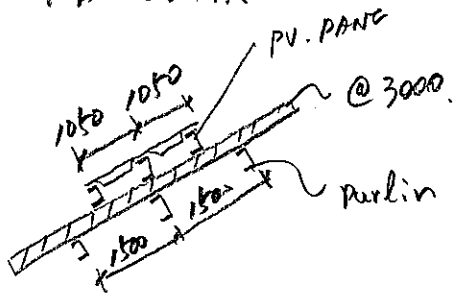
Site	Capacity of PV UNIT		ITEM	Unit Weight	Unit	Piece or m	Weight	Area	unit load		
No 8	Class room-1	45.36	kW	PV Panel	30.5	kg/p	216	6588.0	kg	342.47	31.9
				Base Channel	10.3	kg/m	419.65	4322.4	kg		
				Sub Total					10910.4		
	School Hall	50.4	kW	PV Panel	30.5	kg/p	240	7320.0	kg	380.52	32.3
				Base Channel	10.3	kg/m	483.04	4975.3	kg		
				Sub Total					12295.3		
	Special class room	20.16	kW	PV Panel	30.5	kg/p	96	2928.0	kg	152.21	32.5
				Base Channel	10.3	kg/m	196.19	2020.8	kg		
				Sub Total					4948.8		
	North Class room	15.12	kW	PV Panel	30.5	kg/p	72	2196.0	kg	114.16	31.9
				Base Channel	10.3	kg/m	140.25	1444.6	kg		
				Sub Total					3640.6		
Total Capacity of PV		131.04	kW								

Site	Capacity of PV UNIT		ITEM	Unit Weight	Unit	Piece or m	Weight	Area	unit load		
No 9	Class room-1	27.72	kW	PV Panel	30.5	kg/p	132	4026.0	kg	209.29	32.3
				Base Channel	10.3	kg/m	265.68	2736.5	kg		
				Sub Total					6762.5		
	School Hall	55.44	kW	PV Panel	30.5	kg/p	264	8052.0	kg	418.57	31.9
				Base Channel	10.3	kg/m	513.22	5286.2	kg		
				Sub Total					13338.2		
	Special class room	17.64	kW	PV Panel	30.5	kg/p	84	2562.0	kg	133.18	30.8
				Base Channel	10.3	kg/m	149.41	1538.9	kg		
				Sub Total					4100.9		
Total Capacity of PV		83.16	kW								



# The examination of support frame

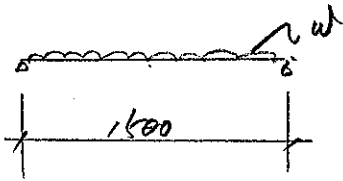
## 1. 桧台受の検討.



Load  $\rightarrow$   
 $w = 0.5 \frac{\text{KN}}{\text{m}^2} \times 3.0 \text{ m} = 1.5 \frac{\text{KN}}{\text{m}}$

$$M = \frac{1}{8} \times 1.5 \times 1.5^2 = 0.43 \text{ KNm}$$

$$Q = \frac{1}{2} \times 1.5 \times 1.5 = 1.13 \text{ KN}$$



Class room Type.

$\square-100 \times 50 \times 20 \times 2.3$   $I_x = 80.7 \times 10^4$   $Z_x = 16.1 \times 10^3$

$f_b = 157$

$$\sigma_b = \frac{0.43 \times 10^6}{16.1 \times 10^3} = 27 \text{ N/mm}^2 \quad \sigma_b / f_b = 0.18 < 0.1$$

$$J_{max} = \frac{5 \times 1.5 \times 1.5^4 \times 10^4}{3.84 \times 2.05 \times 10^5 \times 80.7 \times 10^4}$$

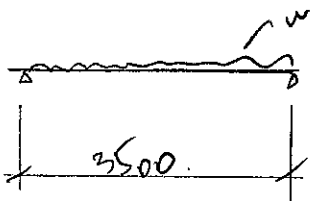
$$= 0.6 \text{ mm} = l/2500$$

OK

OK

New

HALL TYPE.



$$M = \frac{1}{8} \times 1.5 \times 3.5^2 = 2.3 \text{ KNm}$$

$$Q = \frac{1}{2} \times 1.5 \times 3.5 = 2.7 \text{ KN}$$

$$\sigma_b = \frac{2.3 \times 10^6}{16.1 \times 10^3} = 143 \text{ N/mm}^2 \quad \sigma_b / f_b = 0.91$$

OK

$$J_{max} = \frac{5 \times 1.5 \times 3.5^4 \times 10^4}{3.84 \times 2.05 \times 80.7} = 17.8 \text{ mm} = l/196$$

OK

$\Rightarrow \square-120 \times 60 \times 20 \times 2.3$   $I_x = 140$   $Z_x = 23.3$

$$\sigma_b = \frac{2.3 \times 10^3}{23.3} = 99 \quad \sigma_b / f_b = 0.64$$

OK

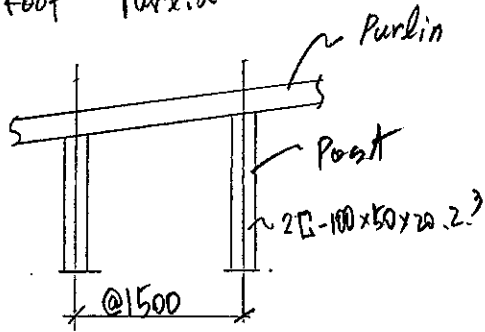
$$J_{max} = \frac{5 \times 1.5 \times 3.5^4 \times 10^4}{3.84 \times 2.05 \times 140} = 10.3 \text{ mm} = l/339$$

OK

2. 既存部材の検討  
Roof for class room  
(教室棟)

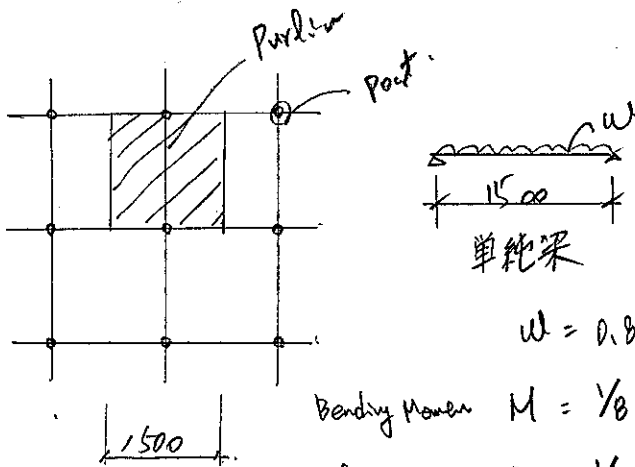
The examination of the existent member  
No.6, No.8, No.9

屋根、母屋検討  
Roof Purlin



Dead load

仕上り	150 N/m <sup>2</sup>	(Finish)
母屋	200 N/m <sup>2</sup>	(Purlin)
1 <sup>st</sup> 補	500 N/m <sup>2</sup>	(PV)
	850 N/m <sup>2</sup>	



$$w = 0.85 \text{ kN/m}^2 \times 1.5 \text{ m} = 1.3 \text{ kN/m}$$

$$\text{Bending Moment } M = \frac{1}{8} \times 1.3 \times 1.5^2 = 0.4 \text{ kN}\cdot\text{m}$$

$$\text{Shear } Q = \frac{1}{2} \times 1.3 \times 1.5 = 1.0 \text{ kN}$$

Purlin

2B-100x50x20x2.3

$$f_b = 157 \text{ N/mm}^2$$

$$I_x = 80.7 \times 2 \quad Z_x = 16.1 \times 2$$

$$\sigma_b = \frac{0.4 \times 10^6}{16.1 \times 2 \times 10^3} = 13 \text{ N/mm}^2 : \frac{\sigma_b}{f_b} = 0.09 < 1.0 \quad \underline{\text{OK}}$$

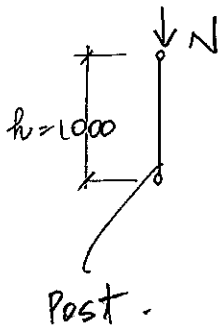
$$\Delta_{\text{max}} = \frac{5 \times 1.3 \times 1.5^4 \times 10}{3.84 \times 2.05 \times 80.7 \times 2} = 0.26 \text{ mm} = \frac{1}{5770} < \frac{1}{300}$$

OK

Ref. KTN-6), 79

(教室棟) For class room

束材の検討



Axial force

$$N = 0.85 \text{ kN/m}^2 \times 1.5 \text{ m} \times 1.5 \text{ m} + 0.5 \text{ kN/m} \times 1.0 \text{ m} \\ = 2.5 \text{ kN}$$

$$\underline{2\text{B}-100 \times 50 \times 20 \times 2.3}$$

$$A = 517 \times 2 = 1034 \text{ mm}^2$$

$$i_y = 19.2 \text{ mm}$$

$$l_k = 1000 \text{ mm} \quad \lambda = 1000 / 19.2 = 53$$

$$f_c = 133 \text{ N/mm}^2$$

$$\sigma_c = \frac{2.5 \times 10^3}{1034} = 2.5 \text{ N/mm}^2$$

$$\sigma_c / f_c = 0.02 < 1.0$$

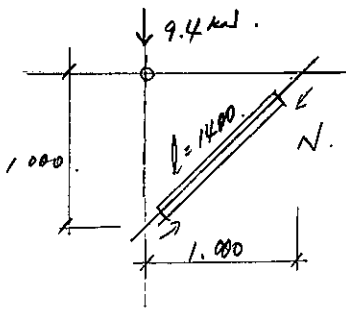
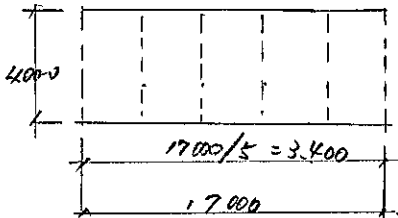
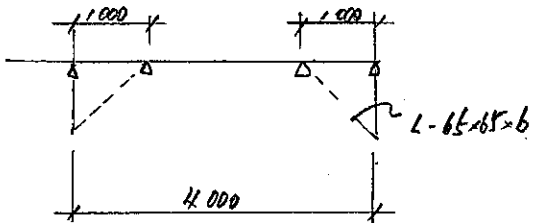
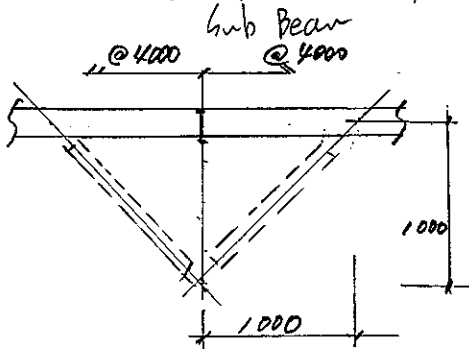
OK.

Ref. KTN-61, 79

No. 8.9

Hall  
(体育館棟)

中間小梁の検討



Sub Beam  
小梁材

(TB43.)

$$L-150 \times 75 \times 6.5 \times 10$$

$$I_x = 861 \text{ cm}^4 \quad Z_x = 115 \text{ cm}^3$$

$$l = 4.0 \text{ m}$$

$$w = 0.85 \text{ kN/m}^2 \times 3.43 \text{ m} = 3.0 \text{ kN/m}$$

$$M = \frac{1}{8} \times 3.0 \times 4.0^2 = 6.0 \text{ kNm}$$

$$Q = \frac{1}{2} \times 3.0 \times 4.0 = 6.0 \text{ kN}$$

$$f_b = 157$$

$$\sigma_b = \frac{6.0 \times 10^4}{115} = 53 \text{ N/mm}^2 \quad \sigma_b / f_b = 0.34 \text{ (1.0)} \quad \text{OK}$$

$$I_{max} = \frac{5 \times 3.0 \times 4.0^2 \times 10}{3.84 \times 2.05 \times 861} = 6 \text{ mm} = 1/666$$

$$N = 6.0 \text{ kN} \times 2 \times \frac{1}{2} \times \sqrt{2} = 8.5 \text{ kN}$$

$$L-65 \times 65 \times 6$$

$$A = 7.527 \text{ cm}^2 \quad i_y = 1.27 \text{ cm}$$

$$l_k = 1400 \text{ mm} \quad \lambda = 1400 / 12.7 = 111$$

$$f_c = 94$$

$$\sigma_c = \frac{8.5 \times 10^4}{7.527} = 12 \text{ N/mm}^2 \quad \sigma_c / f_c = 0.17 \text{ (1.0)}$$

OK.

Ref. KTN-60, 62, 63  
78, 86, 89



Member Design.

(Upper chord.)

$$N = 190 \text{ kN (compression)}$$

$$\underline{2L5-90 \times 90 \times 7} \quad A = 12.22 \times 2 \quad i_y = 1.77 \times 2 = 3.54 \text{ cm}$$

$$l_k = 1720 \quad \lambda = 1720 / 34.5 = 50$$

$$f_c = 135$$

$$\sigma_c = \frac{1900}{24.44} = 78 \text{ N/mm}^2 \quad \sigma_c / f_c = 0.58 < 1.0 \quad \underline{\text{OK}}$$

$$N = 170.4 \text{ kN}$$

$$l_k = 3430 \quad \lambda = 3430 / 34.5 = 100$$

$$f_c = 86.4$$

$$\sigma_c = \frac{1704}{24.44} = 70 \quad \sigma_c / f_c = 0.81 < 1.0 \quad \underline{\text{OK}}$$

(Web.)

$$N = 47 \text{ kN (compression)}$$

$$\underline{L-65 \times 6} \quad A = 7.52 \quad i_y = 1.27 \quad l_k = 1260 \quad \lambda = 100$$

$$f_c = 86.4$$

$$\sigma_c = \frac{470}{7.52} = 62.5 \text{ N/mm}^2 \quad \sigma_c / f_c = 0.73 < 1.0$$

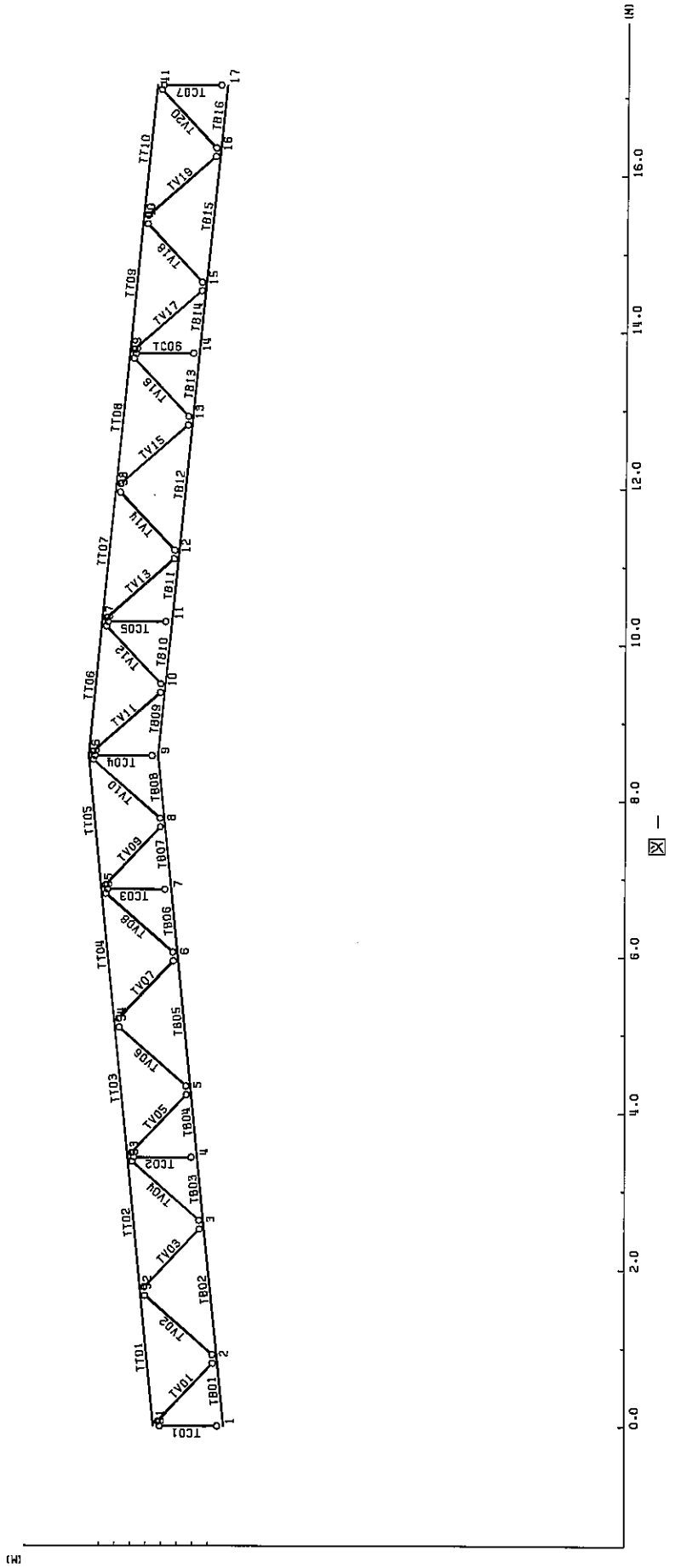
OK

MALDIVES NO.9 GIRLS SECONDARY

縮尺 1:80

架構 ☒

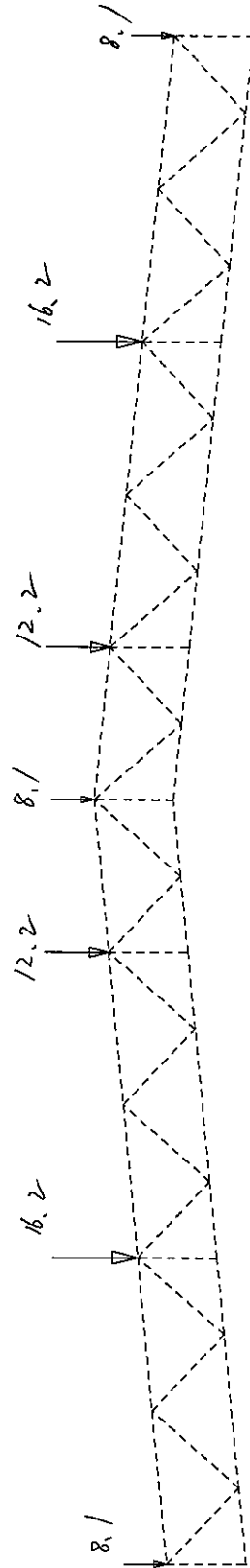
Frame



MALDIVES NO.9 GIRLS SECONDARY

荷 重 图

LOAD



荷重名称 DL+LL  
DEAD LOAD + LIVE LOAD

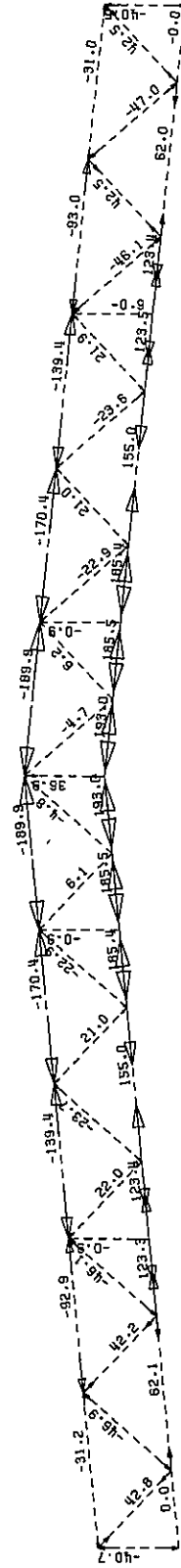


MALDIVES NO.9 GIRLS SECONDARY

単位 : kN

軸力 ☒

Axial force



ケース名称 DL+LL  
CHOUKI OUYOKU

☒

```

      KKK   KKK   AA   NN   MNN  SSSSS   AA   SSSSS   2222222
      KK   KKK   AAA   NN   NN  SSSSSSSSS  AAA   SSSSSSSSS  2222222222
      KK   KKK   AAAA  NNN   NN  SSS   SSS   AAAA  SSS   SSS  222   222
      KK   KKK   AA  AA  NN  NN  NN  SSS   SSS   AA  AA  SSS   SSS  222   222
      KKKKKK   AA  AA  NN  NN  NN  SSS   SSS   AA  AA  SSS   SSS  222   222
      KKKKKK   AA  AA  NN  NN  NN  SSSSSSS  AA  AA  SSSSSSS  222
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      KKKK   KKK  AAA  AAA  NNN  NN  SSSSS   AAA   AAA   SSSSS   22222222222

```

INTEGRATED  
 STRUCTURAL ANALYSIS SYSTEM 2

KANSAS2 STATIC FOR WINDOWS VER. 2.2(2006.7)

DEVELOPED BY IT SOLUTIONS DEPARTMENT

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\*\*\*\*\* INPUT DATA ECHO TOTAL ( 109) \*\*\*\*\*

	10	20	30	40	50	60	70	80
1) TITL MALDIVES NO.9 GIRLS SECONDARY								
2) GENE 2DIN Y B								
3) OUTP								
4) GRID 1	0.0	0.0	0.					
5) GRID 2	0.858	0.086	0.					
6) GRID 3	2.572	0.258	0.					
7) GRID 4	3.43	0.343	0.					
8) GRID 5	4.288	0.429	0.					
9) GRID 6	6.002	0.600	0.					
10) GRID 7	6.860	0.686	0.					
11) GRID 8	7.718	0.772	0.					
12) GRID 9	8.575	0.858	0.					
13) GRID 10	9.433	0.772	0.					
14) GRID 11	10.290	0.686	0.					
15) GRID 12	11.148	0.600	0.					
16) GRID 13	12.862	0.429	0.					
17) GRID 14	13.726	0.343	0.					
18) GRID 15	14.578	0.258	0.					
19) GRID 16	16.292	0.086	0.					
20) GRID 17	17.150	0.0	0.					
21) *****								
22) GRID 31	0.0	0.9	0.					
23) GRID 32	1.715	1.072	0.					
24) GRID 33	3.430	1.243	0.					
25) GRID 34	5.145	1.414	0.					
26) GRID 35	6.860	1.586	0.					
27) GRID 36	8.575	1.758	0.					
28) GRID 37	10.290	1.586	0.					
29) GRID 38	12.005	1.414	0.					
30) GRID 39	13.720	1.243	0.					
31) GRID 40	15.435	1.072	0.					
32) GRID 41	17.150	0.90	0.					
33) *****								
34) *MATE:S								
35) MATE 1	205000.	79000.	0.3	1.20E-05	77.	0.32	25.	
36) *PRO1:0::!								
37) PRO1 1	24.44		186.					
38) PRO1 2	7.52		29.4					
39) PRO1 3	15.04		58.8					
40) PRO1 4	39.65		1620.00					
41) *****								
42) BEAM TB01	1	1	1	2				
43) BEAM TB02	1	1	2	3				
44) BEAM TB03	1	1	3	4				
45) BEAM TB04	1	1	4	5				
46) BEAM TB05	1	1	5	6				
47) BEAM TB06	1	1	6	7				
48) BEAM TB07	1	1	7	8				
49) BEAM TB08	1	1	8	9				
50) BEAM TB09	1	1	9	10				

0

KTN-18

\*\*\*\*\* INPUT DATA ECHO TOTAL ( 109) \*\*\*\*\*

	10	20	30	40	50	60	70	80
51) BEAM TB10			1	1	10			
52) BEAM TB11			1	1	11			
53) BEAM TB12			1	1	12			
54) BEAM TB13			1	1	13			
55) BEAM TB14			1	1	14			
56) BEAM TB15			1	1	15			
57) BEAM TB16			1	1	16			
58) BEAM TT01			1	1	31			
59) BEAM TT02			1	1	32			
60) BEAM TT03			1	1	33			
61) BEAM TT04			1	1	34			
62) BEAM TT05			1	1	35			
63) BEAM TT06			1	1	36			
64) BEAM TT07			1	1	37			
65) BEAM TT08			1	1	38			
66) BEAM TT09			1	1	39			
67) BEAM TT10			1	1	40			
68) BEAM TC01			1	4	1	31		1 1
69) BEAM TC02			1	3	4	33		1 1
70) BEAM TC03			1	3	7	35		1 1
71) BEAM TC04			1	3	9	36		1 1
72) BEAM TC05			1	3	11	37		1 1
73) BEAM TC06			1	3	14	39		1 1
74) BEAM TC07			1	4	17	41		1 1
75) BEAM TV01			1	4	31	2		1 1
76) BEAM TV02			1	2	2	32		1 1
77) BEAM TV03			1	2	32	3		1 1
78) BEAM TV04			1	2	3	33		1 1
79) BEAM TV05			1	2	33	5		1 1
80) BEAM TV06			1	2	5	34		1 1
81) BEAM TV07			1	2	34	6		1 1
82) BEAM TV08			1	2	6	35		1 1
83) BEAM TV09			1	2	35	8		1 1
84) BEAM TV10			1	2	8	36		1 1
85) BEAM TV11			1	2	36	10		1 1
86) BEAM TV12			1	2	10	37		1 1
87) BEAM TV13			1	2	37	12		1 1
88) BEAM TV14			1	2	12	38		1 1
89) BEAM TV15			1	2	38	13		1 1
90) BEAM TV16			1	2	13	39		1 1
91) BEAM TV17			1	2	39	15		1 1
92) BEAM TV18			1	2	15	40		1 1
93) BEAM TV19			1	2	40	16		1 1
94) BEAM TV20			1	2	16	41		1 1
95) *****								
96) LOAD DL+LL								DEAD LOAD + LIVE LOAD
97) FORC 31								-8.1
98) FORC 33								-16.2
99) FORC 35								-12.2
100) FORC 36								-8.1

69

KTN-19

\*\*\*\*\* INPUT DATA ECHO TOTAL ( 109) \*\*\*\*\*

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          10      20      30      40      50      60      70      80
.....!.....!.....!.....!.....!.....!.....!.....!.....!
101) FORC  37                                -12.2
102) FORC  39                                -16.2
103) FORC  41                                -8.1
104) *****
105) BOUN B001  SHITEN
106) BOF1   1                                11
107) BOF1  17                                1
108) RUN DL+LL  Y B00TDL+LL  CHOUKI OURYOKU
109) END
0 .....!.....!.....!.....!.....!.....!.....!.....!.....!
          10      20      30      40      50      60      70      80
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88

KTN-20

\*\*\*\* N O D A L P O I N T L O C A T I O N ( GLOBAL-COORDINATE) \*\*\*\*

POINT NO.	X (M)	Y (M)	Z (M)	C1 C2	POINT NO.	X (M)	Y (M)	Z (M)	C1 C2
1)	0.0000	0.0000	0.0000	0 0	15)	14.5780	0.2580	0.0000	0 0
2)	0.8580	0.0860	0.0000	0 0	16)	16.2920	0.0860	0.0000	0 0
3)	2.5720	0.2580	0.0000	0 0	17)	17.1500	0.0000	0.0000	0 0
4)	3.4300	0.3430	0.0000	0 0	31)	0.0000	0.9000	0.0000	0 0
5)	4.2880	0.4290	0.0000	0 0	32)	1.7150	1.0720	0.0000	0 0
6)	6.0020	0.6000	0.0000	0 0	33)	3.4300	1.2430	0.0000	0 0
7)	6.8600	0.6860	0.0000	0 0	34)	5.1450	1.4140	0.0000	0 0
8)	7.7180	0.7720	0.0000	0 0	35)	6.8600	1.5860	0.0000	0 0
9)	8.5750	0.8580	0.0000	0 0	36)	8.5750	1.7580	0.0000	0 0
10)	9.4330	0.7720	0.0000	0 0	37)	10.2900	1.5860	0.0000	0 0
11)	10.2900	0.6860	0.0000	0 0	38)	12.0050	1.4140	0.0000	0 0
12)	11.1480	0.6000	0.0000	0 0	39)	13.7200	1.2430	0.0000	0 0
13)	12.8620	0.4290	0.0000	0 0	40)	15.4350	1.0720	0.0000	0 0
14)	13.7260	0.3430	0.0000	0 0	41)	17.1500	0.9000	0.0000	0 0

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MAX. 17.1500 1.7580 0.0000  
 MIN. 0.0000 0.0000 0.0000

\*\*\*\*\* MEMBER DATA ( BEAM ) \*\*\*\*\* ( TOTAL 53 )

MEMBER NAME	LENG (M)	NODAL POINT	CONDITION		AREA (CM2)	INERTIA-X (CM4)	INERTIA-Y (CM4)	INERTIA-Z (CM4)	KAPPA		E (N/MM2)	G (N/MM2)	ADJUSTING ANGLE (DEG.)	LENG (M)		
	L	I	J	XYZ	XYZ	IX	IY	IZ	KY	KZ			(DEG.)	LD(Y)	LD(Z)	
TB01	0.86	1	2	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	0.86
TB02	1.72	2	3	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TB03	0.86	3	4	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	0.86
TB04	0.86	4	5	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	0.86
TB05	1.72	5	6	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TB06	0.86	6	7	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	0.86
TB07	0.86	7	8	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	0.86
TB08	0.86	8	9	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	0.86
TB09	0.86	9	10	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	0.86
TB10	0.86	10	11	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	0.86
TB11	0.86	11	12	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	0.86
TB12	1.72	12	13	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TB13	0.87	13	14	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	0.87
TB14	0.86	14	15	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	0.86
TB15	1.72	15	16	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TB16	0.86	16	17	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	0.86
TT01	1.72	31	32	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TT02	1.72	32	33	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TT03	1.72	33	34	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TT04	1.72	34	35	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TT05	1.72	35	36	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TT06	1.72	36	37	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TT07	1.72	37	38	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TT08	1.72	38	39	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TT09	1.72	39	40	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TT10	1.72	40	41	000	000	2.444E+01	0.000E+00	0.000E+00	1.860E+02	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
TC01	0.90	1	31	001	001	3.965E+01	0.000E+00	0.000E+00	1.620E+03	0.00	0.00	205000.00	79000.00	0.00	0.00	0.90
TC02	0.90	4	33	001	001	1.504E+01	0.000E+00	0.000E+00	5.880E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	0.90
TC03	0.90	7	35	001	001	1.504E+01	0.000E+00	0.000E+00	5.880E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	0.90
TC04	0.90	9	36	001	001	1.504E+01	0.000E+00	0.000E+00	5.880E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	0.90
TC05	0.90	11	37	001	001	1.504E+01	0.000E+00	0.000E+00	5.880E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	0.90
TC06	0.90	14	39	001	001	1.504E+01	0.000E+00	0.000E+00	5.880E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	0.90
TC07	0.90	17	41	001	001	3.965E+01	0.000E+00	0.000E+00	1.620E+03	0.00	0.00	205000.00	79000.00	0.00	0.00	0.90
TV01	1.18	31	2	001	001	3.965E+01	0.000E+00	0.000E+00	1.620E+03	0.00	0.00	205000.00	79000.00	0.00	0.00	1.18
TV02	1.31	2	32	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.31
TV03	1.18	32	3	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.18
TV04	1.31	3	33	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.31
TV05	1.18	33	5	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.18
TV06	1.31	5	34	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.31
TV07	1.18	34	6	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.18
TV08	1.31	6	35	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.31
TV09	1.18	35	8	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.18
TV10	1.31	8	36	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.31
TV11	1.31	36	10	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.31
TV12	1.18	10	37	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.18
TV13	1.31	37	12	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.31
TV14	1.18	12	38	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.18
TV15	1.31	38	13	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.31
TV16	1.18	13	39	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.18
TV17	1.31	39	15	001	001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.31

\*\*\*\*\* MEMBER DATA ( BEAM ) \*\*\*\*\* ( TOTAL 53 )

MEMBER NAME	LENG (M)	NODAL POINT	CONDITION		AREA (CM2)	INERTIA-X (CM4)	INERTIA-Y (CM4)	INERTIA-Z (CM4)	KAPPA		E (N/MM2)	G (N/MM2)	ADJUSTING ANGLE (DEG.)	LENG (M)	
	L	I J	XYZ XYZ		A	IX	IY	IZ	KY	KZ				LD(Y)	LD(Z)
TV18	1.18	15	40	001 001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.18
TV19	1.31	40	16	001 001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.31
TV20	1.18	16	41	001 001	7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	1.18
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MAX.	1.72				3.965E+01	0.000E+00	0.000E+00	1.620E+03	0.00	0.00	205000.00	79000.00	0.00	0.00	1.72
MIN.	0.86				7.520E+00	0.000E+00	0.000E+00	2.940E+01	0.00	0.00	205000.00	79000.00	0.00	0.00	0.86

KTN-23



\*\*\*\* MEMBER DATA ( BEAM ) \*\*\*\* ( TOTAL 53 )

MEMBER NAME	RIGID ZONE (M)				PHAI						ALPHA (1/DEG)	DENSITY RHO (KN/M3)	Y VECTOR OF MEMBER COOR.		VERTICAL MEMBER
	Y-I	Y-J	Z-I	Z-J	IX	IY	IZ	AXIAL	KY	KZ					
TB01	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TB02	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TB03	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TB04	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TB05	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TB06	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TB07	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TB08	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TB09	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TB10	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TB11	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TB12	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TB13	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TB14	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TB15	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TB16	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TT01	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TT02	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TT03	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TT04	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TT05	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.10	1.00	0.00
TT06	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TT07	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TT08	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TT09	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TT10	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.10	1.00	0.00
TC01	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-1.00	0.00	0.00
TC02	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-1.00	0.00	0.00
TC03	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-1.00	0.00	0.00
TC04	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-1.00	0.00	0.00
TC05	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-1.00	0.00	0.00
TC06	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-1.00-0.01	0.00	0.00
TC07	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-1.00	0.00	0.00
TV01	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.69	0.73	0.00
TV02	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.75	0.66	0.00
TV03	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.69	0.73	0.00
TV04	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.75	0.66	0.00
TV05	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.69	0.73	0.00
TV06	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.75	0.66	0.00
TV07	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.69	0.73	0.00
TV08	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.75	0.66	0.00
TV09	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.69	0.73	0.00
TV10	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.75	0.66	0.00
TV11	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.75	0.66	0.00
TV12	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.69	0.73	0.00
TV13	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.75	0.66	0.00
TV14	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.69	0.73	0.00
TV15	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.75	0.66	0.00
TV16	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.69	0.73	0.00
TV17	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.75	0.66	0.00

69

K7N-29

\*\*\*\*\* MEMBER DATA ( BEAM ) \*\*\*\*\* ( TOTAL 53 )

MEMBER NAME	RIGID ZONE (M)				PHAI						ALPHA (1/DEG)	DENSITY RHO (KN/M3)	Y VECTOR OF MEMBER COOR.			VERTICAL MEMBER
	Y-I	Y-J	Z-I	Z-J	IX	IY	IZ	AXIAL	KY	KZ						
TV18	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.69	0.73	0.00	
TV19	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	0.75	0.66	0.00	
TV20	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000	-0.69	0.73	0.00	
-----+-----																
MAX.	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000				
MIN.	0.00	0.00	0.00	0.00	1.000	1.000	1.000	1.000	1.000	1.000	1.200D-05	77.0000				

KTN-25

46

\*\*\*\*\* L O A D D A T A \*\*\*\*\*

NO.	LOAD NAME	GROUP NO.	TITLE
0	1 DL+LL	0	DEAD LOAD + LIVE LOAD

16

KTN-26

\*\*\*\*\* N O D A L P O I N T F O R C E D A T A \*\*\*\*\*

CASE(DL+LL) LABEL( DEAD LOAD + LIVE LOAD )

POINT NO.	COORDINATE NO.	X-FORCE (KN)	Y-FORCE (KN)	Z-FORCE (KN)
31	0	0.00000	-8.10000	0.00000
33	0	0.00000	-16.20000	0.00000
35	0	0.00000	-12.20000	0.00000
36	0	0.00000	-8.10000	0.00000
37	0	0.00000	-12.20000	0.00000
39	0	0.00000	-16.20000	0.00000
41	0	0.00000	-8.10000	0.00000

24

KTN-27

\*\*\*\* BOUNDARY CONDITION DATA \*\*\*\*

	NO.	BOUD. NAME	TITLE
0	1	B001	SHITEN

33

KTN-28

\*\*\*\* SINGLE POINT CONSTRAINT \*\*\*\*

CASE( B001) LABEL( SHITEN )

POINT CONDITION	COORDINATE NUMBER	NODAL POINT NUMBER
XYZYZ		
110000	0	1
010000	0	17

26

KTN-29

\*\*\*\*\* R U N D A T A \*\*\*\*\*

	NO.	CASE	YES/NO	BOUD.	LOAD	GROUP NO.	TITLE
0	1	DL+LL	Y	B001	DL+LL	0	CHOUKI OURYOKU

25

167N-30

\*\*\*\*\* NODAL POINT LOAD VECTOR \*\*\*\*\*

LOAD(DL+LL) LABEL( DEAD LOAD + LIVE LOAD )

POINT NO.	X (KN)	Y (KN)	Z (KN)	M-X (KN.M)	M-Y (KN.M)	M-Z (KN.M)
31	0.00000	-8.10000	0.00000	0.0000000	0.0000000	0.0000000
33	0.00000	-16.20000	0.00000	0.0000000	0.0000000	0.0000000
35	0.00000	-12.20000	0.00000	0.0000000	0.0000000	0.0000000
36	0.00000	-8.10000	0.00000	0.0000000	0.0000000	0.0000000
37	0.00000	-12.20000	0.00000	0.0000000	0.0000000	0.0000000
39	0.00000	-16.20000	0.00000	0.0000000	0.0000000	0.0000000
41	0.00000	-8.10000	0.00000	0.0000000	0.0000000	0.0000000
0 +-----+						
TOTAL	0.00000	-81.70000	0.00000	0.0000000	0.0000000	0.0000000

96

KTN-31



\*\*\*\*\* N O D A L P O I N T D I S P L A C E M E N T \*\*\*\*\*

CASE(DL+LL) LABEL( CHOUKI OURYOKU )

POINT NO.	X (CM)	Y (CM)	Z (CM)	R-X (RAD/1000)	R-Y (RAD/1000)	R-Z (RAD/1000)	COORD
1	0.000000	0.000000	0.000000	0.000000	0.000000	-4.916640	0
2	0.042734	-0.426314	0.000000	0.000000	0.000000	-5.072805	0
3	0.153050	-1.311732	0.000000	0.000000	0.000000	-5.077144	0
4	0.214858	-1.720405	0.000000	0.000000	0.000000	-4.362096	0
5	0.269680	-2.054426	0.000000	0.000000	0.000000	-3.590047	0
6	0.376089	-2.584200	0.000000	0.000000	0.000000	-2.606406	0
7	0.426830	-2.770459	0.000000	0.000000	0.000000	-1.692542	0
8	0.469305	-2.874089	0.000000	0.000000	0.000000	-0.982028	0
9	0.507782	-2.925259	0.000000	0.000000	0.000000	-0.021202	0
10	0.545942	-2.877574	0.000000	0.000000	0.000000	0.941741	0
11	0.588034	-2.777518	0.000000	0.000000	0.000000	1.651457	0
12	0.638423	-2.594770	0.000000	0.000000	0.000000	2.566790	0
13	0.744127	-2.072063	0.000000	0.000000	0.000000	3.540674	0
14	0.798745	-1.739351	0.000000	0.000000	0.000000	4.339777	0
15	0.860134	-1.336378	0.000000	0.000000	0.000000	4.997423	0
16	0.969761	-0.457364	0.000000	0.000000	0.000000	5.283341	0
17	1.015603	0.000000	0.000000	0.000000	0.000000	5.354193	0
31	0.434316	-0.004508	0.000000	0.000000	0.000000	-5.146969	0
32	0.512002	-0.886804	0.000000	0.000000	0.000000	-5.121062	0
33	0.563023	-1.720675	0.000000	0.000000	0.000000	-4.314958	0
34	0.577460	-2.348769	0.000000	0.000000	0.000000	-3.054134	0
35	0.560879	-2.770732	0.000000	0.000000	0.000000	-1.651349	0
36	0.509635	-2.914496	0.000000	0.000000	0.000000	-0.020206	0
37	0.457676	-2.777795	0.000000	0.000000	0.000000	1.608601	0
38	0.440392	-2.362858	0.000000	0.000000	0.000000	3.019086	0
39	0.454110	-1.741912	0.000000	0.000000	0.000000	4.249949	0
40	0.504462	-0.914596	0.000000	0.000000	0.000000	5.176408	0
41	0.585029	-0.004482	0.000000	0.000000	0.000000	5.362676	0

0 +-----+-----+-----+-----+-----+-----+-----+-----+

MAX. VALUE POINT	1.015603 ( 17)	0.000000 ( 17)	0.000000 ( 41)	0.000000 ( 41)	0.000000 ( 41)	5.362676 ( 41)
MIN. VALUE POINT	0.000000 ( 1)	-2.925259 ( 9)	0.000000 ( 41)	0.000000 ( 41)	0.000000 ( 41)	-5.146969 ( 31)

66

KTN-32

\*\*\*\*\* NODAL POINT REACTION FORCES \*\*\*\*\*

CASE(DL+LL) LABEL( CHOUKI OURYOKU )

POINT NO.	X (KN)	Y (KN)	Z (KN)	M-X (KN.M)	M-Y (KN.M)	M-Z (KN.M)
1	0.000000	40.550000	0.000000	0.000000	0.000000	0.000000
17	0.000000	40.550000	0.000000	0.000000	0.000000	0.000000
-----+-----+-----						
TOTAL	6.608492E-12	8.110000E+01	0.000000E+00	0.000000E+00	0.000000E+00	-6.962486E-14
LOAD TOTAL	0.000000E+00	-8.110000E+01	0.000000E+00			

78

KTN-33

\*\*\*\*\* STRESSES IN BEAM ELEMENTS \*\*\*\*\*

CASE(DL+LL) LABEL( CHOUKI OURYOKU )

MEMBER NAME	BENDING MOMENT				SHEAR				AXIAL FORCE		TWIST MOMENT (KN.M)
	MZ-I (KN.M)	MZ-J (KN.M)	MY-I (KN.M)	MY-J (KN.M)	QZ-I (KN)	QZ-J (KN)	QY-I (KN)	QY-J (KN)	N-I (KN)	N-J (KN)	
TB01	0.000	-0.138	0.000	0.000	0.000	0.000	-0.160	-0.160	0.02	0.02	0.000
TB02	-0.138	0.136	0.000	0.000	0.000	0.000	0.159	0.159	62.12	62.12	0.000
TB03	0.136	0.496	0.000	0.000	0.000	0.000	0.418	0.418	123.30	123.30	0.000
TB04	0.496	0.187	0.000	0.000	0.000	0.000	-0.359	-0.359	123.39	123.39	0.000
TB05	0.187	0.249	0.000	0.000	0.000	0.000	0.036	0.036	155.01	155.01	0.000
TB06	0.249	0.559	0.000	0.000	0.000	0.000	0.360	0.360	185.41	185.41	0.000
TB07	0.559	0.069	0.000	0.000	0.000	0.000	-0.568	-0.568	185.51	185.51	0.000
TB08	0.069	0.782	0.000	0.000	0.000	0.000	0.827	0.827	192.98	192.98	0.000
TB09	0.782	0.070	0.000	0.000	0.000	0.000	-0.825	-0.825	192.98	192.98	0.000
TB10	0.070	0.558	0.000	0.000	0.000	0.000	0.567	0.567	185.51	185.51	0.000
TB11	0.558	0.251	0.000	0.000	0.000	0.000	-0.356	-0.356	185.42	185.42	0.000
TB12	0.251	0.180	0.000	0.000	0.000	0.000	-0.041	-0.041	155.00	155.00	0.000
TB13	0.180	0.522	0.000	0.000	0.000	0.000	0.394	0.394	123.46	123.46	0.000
TB14	0.522	0.064	0.000	0.000	0.000	0.000	-0.535	-0.535	123.36	123.36	0.000
TB15	0.064	0.063	0.000	0.000	0.000	0.000	-0.001	-0.001	61.98	61.98	0.000
TB16	0.063	0.000	0.000	0.000	0.000	0.000	-0.073	-0.073	-0.01	-0.01	0.000
TT01	0.000	0.011	0.000	0.000	0.000	0.000	0.007	0.007	-31.24	-31.24	0.000
TT02	0.011	0.345	0.000	0.000	0.000	0.000	0.194	0.194	-92.92	-92.92	0.000
TT03	0.345	0.213	0.000	0.000	0.000	0.000	-0.077	-0.077	-139.39	-139.39	0.000
TT04	0.213	0.408	0.000	0.000	0.000	0.000	0.113	0.113	-170.36	-170.36	0.000
TT05	0.408	0.314	0.000	0.000	0.000	0.000	-0.055	-0.055	-189.92	-189.92	0.000
TT06	0.314	0.407	0.000	0.000	0.000	0.000	0.054	0.054	-189.93	-189.93	0.000
TT07	0.407	0.217	0.000	0.000	0.000	0.000	-0.110	-0.110	-170.35	-170.35	0.000
TT08	0.217	0.328	0.000	0.000	0.000	0.000	0.064	0.064	-139.41	-139.41	0.000
TT09	0.328	0.082	0.000	0.000	0.000	0.000	-0.142	-0.142	-92.97	-92.97	0.000
TT10	0.082	0.000	0.000	0.000	0.000	0.000	-0.048	-0.048	-30.98	-30.98	0.000
TC01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-40.71	-40.71	0.000
TC02	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.92	-0.92	0.000
TC03	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.93	-0.93	0.000
TC04	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	36.87	36.87	0.000
TC05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.95	-0.95	0.000
TC06	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-0.91	-0.91	0.000
TC07	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-40.48	-40.48	0.000
TV01	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	42.84	42.84	0.000
TV02	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-46.86	-46.86	0.000
TV03	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	42.23	42.23	0.000
TV04	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-46.12	-46.12	0.000
TV05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	22.03	22.03	0.000
TV06	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-23.66	-23.66	0.000
TV07	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	21.04	21.04	0.000
TV08	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-22.89	-22.89	0.000
TV09	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.13	6.13	0.000
TV10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-4.77	-4.77	0.000
TV11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-4.74	-4.74	0.000
TV12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.15	6.15	0.000
TV13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-22.90	-22.90	0.000
TV14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	21.04	21.04	0.000
TV15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-23.63	-23.63	0.000
TV16	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	21.94	21.94	0.000
TV17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-46.15	-46.15	0.000

66

KTN-34

\*\*\*\* STRESSES IN BEAM ELEMENTS \*\*\*\*

CASE(DL+LL) LABEL( CHOUKI OURYOKU )

MEMBER NAME	BENDING MOMENT				SHEAR				AXIAL FORCE		TWIST MOMENT (KN.M)
	MZ-I (KN.M)	MZ-J (KN.M)	MY-I (KN.M)	MY-J (KN.M)	QZ-I (KN)	QZ-J (KN)	QY-I (KN)	QY-J (KN)	N-I (KN)	N-J (KN)	
TV18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	42.51	42.51	0.000
TV19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-47.03	-47.03	0.000
TV20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	42.48	42.48	0.000

MAX. VALUE (MEMBER)	0.782 ( TB09 )	0.782 ( TB08 )	0.000 ( TB01 )	0.000 ( TB01 )	0.000 ( TB01 )	0.000 ( TB01 )	0.827 ( TB08 )	0.827 ( TB08 )	192.98 ( TB08 )	192.98 ( TB08 )	0.000 ( TB01 )
MIN. VALUE (MEMBER)	-0.138 ( TB02 )	-0.138 ( TB01 )	0.000 ( TB01 )	0.000 ( TB01 )	0.000 ( TB01 )	0.000 ( TB01 )	-0.825 ( TB09 )	-0.825 ( TB09 )	-189.93 ( TT06 )	-189.93 ( TT06 )	0.000 ( TB01 )

\*\*\*\*\* SUMMARY OF ANALYSIS \*\*\*\*\*

```

-----
! TITLE  ! MALDIVES NO.9 GIRLS SECONDARY  !
-----
! STAFF  ! YEC  !
-----
! DATE  ! 2009/06/13 11:21:09  !
-----
! MODEL  ! 2-DIMENSIONAL ANALYSIS(IN-PLANE,PLANE-STRES)  !
-----
! NODAL  !  !
! POINT  ! ( 28)  !
-----
! ELEMENT ! BEAM ( 53)! TRUSS ( 0)!<<TOTAL>> ( 53)!
!         ! MEMBRANE ( 0)! PLATE ( 0)!
!         ! SHELL ( 0)! SPRING ( 0)!
!         ! SOLID ( 0)!
-----
! LOAD   ! BODY FORCE ( 0)!<<TOTAL>> ( 7)!
! CASE( 1)! NODAL FORCE ( 7)!
!         ! ENFORCED DISP. ( 0)!
!         ! MID LOAD <BEAM> ( 0)!
!         ! PRESSURE LOAD<SHELL> ( 0)!
!         ! PRESSURE LOAD<SOLID> ( 0)!
!         ! LINE FORCE ( 0)!
!         ! TEMP. LOAD <BEAM> ( 0)!
!         ! TEMP. LOAD <SHELL> ( 0)!
!         ! TEMP. LOAD <SOLID> ( 0)!
-----
! LOAD   !
! COMB.  ! ( 0)
-----
! BOUNDARY ! BOUNDARY FIX OR SPRING ( Y)!
! CONDITION! DISTRIBUTED SPRING ( N)!
-----
! SPECIAL ! ZERO STIFFNESS ( N)! REMAIN STRAIGHT ( N)!
! FUNCTION ! REMAIN PLANE ( N)! MULTIPPOINT CONSTRAINTS ( N)!
!         ! SAME DISPLACEMENT ( N)!
-----
! RUN CASE ! NUMBER OF!
!         ! ( 1)! CARDS ! ( 101)!
-----
! STRESS ! ANALYSIS !
! COMB.  ! ( 0)! METHOD ! DIRECT SPARSE SOLVER !
-----
! PLOT DATA! ( -)! CPU TIME ! 0.031 SEC !
-----

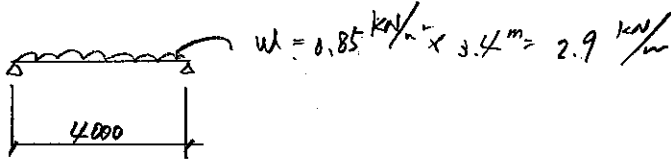
```

BY PC-WINDOWS KANSAS2

No.6 (Hall)

No.6. 體育館.

層根梁 (Beam)



$$w = 0.85 \frac{\text{KN}}{\text{m}} \times 3.4 \text{ m} = 2.9 \frac{\text{KN}}{\text{m}}$$

$$M = \frac{1}{8} \times 2.9 \times 4.0^2 = 5.8 \text{ KN}\cdot\text{m}$$

$$Q = \frac{1}{2} \times 2.9 \times 4.0 = 5.8 \text{ KN}$$

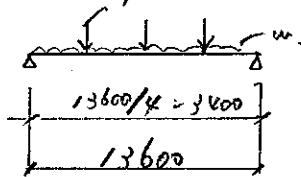
$$\underline{H-194 \times 150 \times 6 \times 9} \quad I_x = 2630 \text{ cm}^4 \quad Z_x = 271 \text{ cm}^3$$

$$f_b = 157$$

$$\sigma_b = \frac{5.8 \times 10^3}{271} = 22 \frac{\text{N}}{\text{mm}^2} \quad \sigma_b / f_b = 0.14 < 1.0 \quad \underline{\text{OK}}$$

$$\delta_{\text{max}} = \frac{5 \times 2.9 \times 4.0^4 \times 10}{3.84 \times 2.05 \times 2630} = 1.8 \text{ mm} = \frac{1}{2222} \quad \underline{\text{OK}}$$

No.6  
Main Beam (Hall)



$$P = 5.8 \times 2 = 11.6 \text{ KN} \quad w = 0.85 \frac{\text{KN}}{\text{m}} \times 0.5 \text{ m} + 1.5 \frac{\text{KN}}{\text{m}} = 2.0 \frac{\text{KN}}{\text{m}}$$

$$M = \frac{1}{2} \times 11.6 \times 13.6 \text{ m} + \frac{1}{8} \times 2.0 \times 13.6^2 = 78.9 + 46.3 = 125.2 \text{ KN}\cdot\text{m}$$

$$Q = \frac{3}{2} \times 11.6 \text{ KN} + \frac{1}{2} \times 2.0 \times 13.6 = 17.4 + 13.6 = 31.0 \text{ KN}$$

$$\underline{H-600 \times 200 \times 11 \times 17} \quad I_x = 75600 \text{ m}^4 \quad Z_x = 2520 \text{ m}^3 \quad l_b = 3400$$

$$f_b = \frac{89000 \times 17 \times 200}{3400 \times 600} = 148 \frac{\text{N}}{\text{mm}^2}$$

$$\sigma_b = \frac{125.2 \times 10^3}{2520} = 50 \frac{\text{N}}{\text{mm}^2} \quad \sigma_b / f_b = 0.34 < 1.0 \quad \underline{\text{OK}}$$

$$\delta_{\text{max}} = \frac{5 \times 2.0 \times 13.6^4 \times 10}{3.84 \times 2.05 \times 75600} + \frac{19 \times 11.6 \times 10^3 \times 13.6^3 \times 10^9}{3.84 \times 2.05 \times 75600}$$

$$= 5.75 + 9.4 = 15.15 \text{ mm} = \frac{1}{897} \quad \underline{\text{OK}}$$

Ref. KTN-47.48

## Foundation.

For class room

All buildings are designed in the mat foundation

ex. 1<sup>st</sup> building

$$8.0 \times 5 = 40 \text{ kN/m}^2$$

$$\text{about } 40 \sim 45 \text{ kN/m}^2 < 100 \text{ kN/m}^2$$

O.K.

For Hall

$$\text{roof } (0.35 + 0.5 + 1.0) \text{ kN/m}^2 \times 4.0 \times 9.0 = 66.6$$

$$\text{floor } 10.0 \text{ kN/m}^2 \times 3.0 \times 4.0 \times 2 = 240$$

$$\text{Foundac } 4.0 \times 3.25 \text{ m}$$

$$\sigma_e = \frac{306.6}{13}$$

$$= 23.6 \text{ kN/m}^2 < 100 \text{ kN/m}^2$$

O.K.

Ref. KTN - 76

- 59

3. AS- Build DWG

No. 6.

Kalaa faanu School

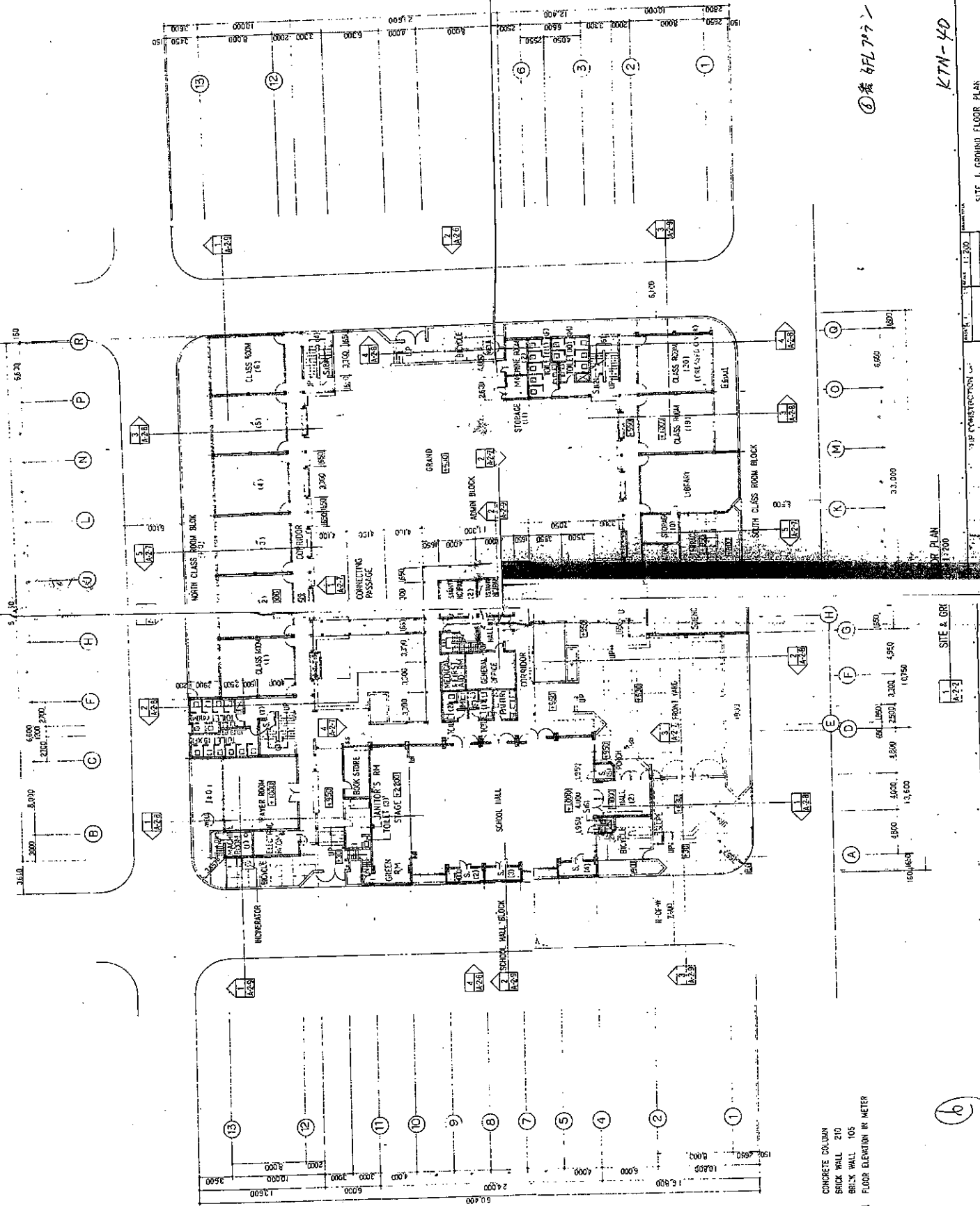
AS- Build DWG.





KTN-40

6 麓 4FL 7-7-7

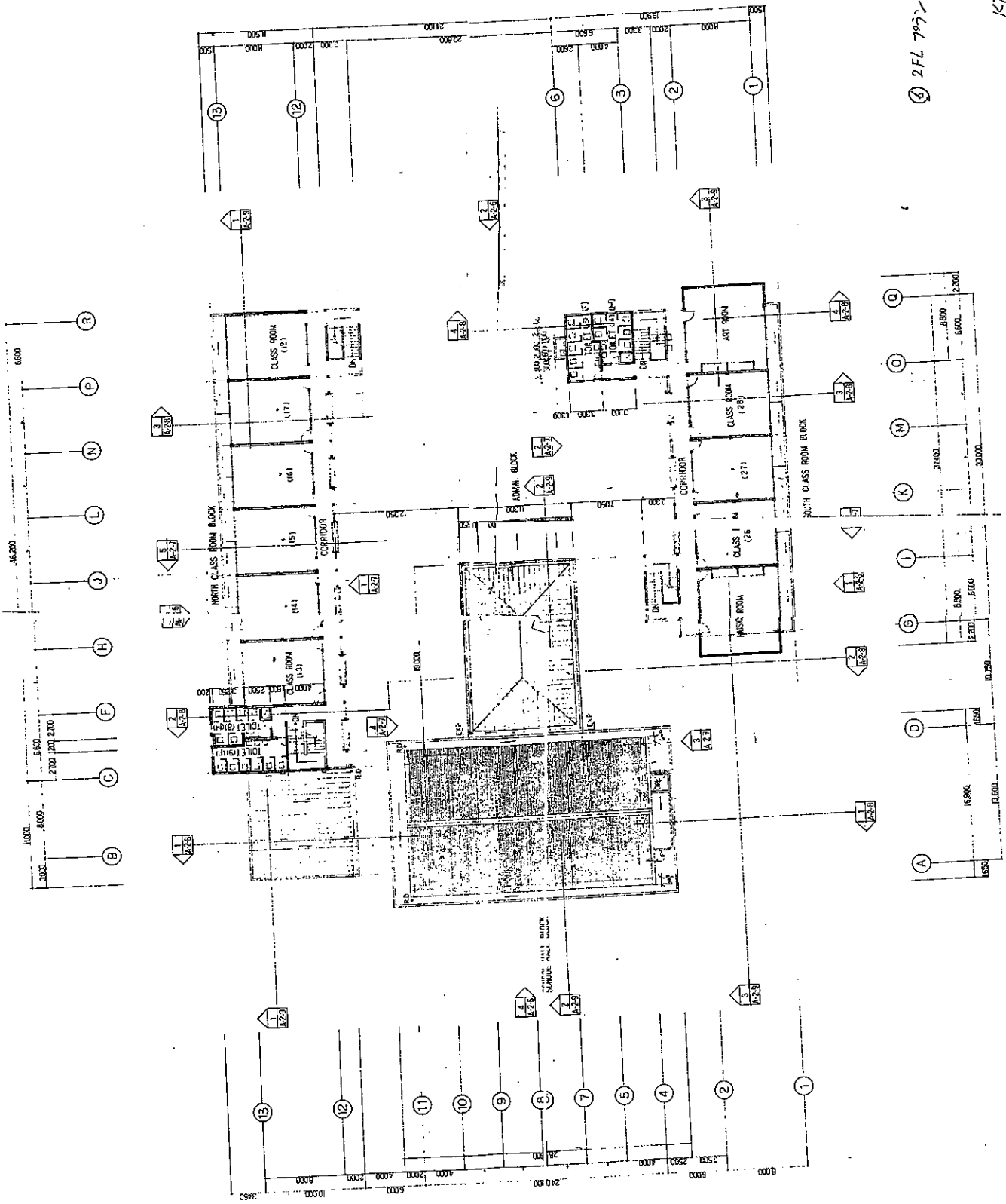


- LEGEND
- CONCRETE COLUMN
  - ▬ BRICK WALL 210
  - ▬ BRICK WALL 105
  - FLOOR ELEVATION IN METER

KTN-40

6

Vertical text on the left margin, possibly a scale or reference note.



⑥ 2FL 7927

KTN-41

1/11/30

SECOND FLOOR PLAN

SECOND FLOOR PL 3-11-201

PROJECT: ...

1/11/30

SECOND FLOOR PLAN

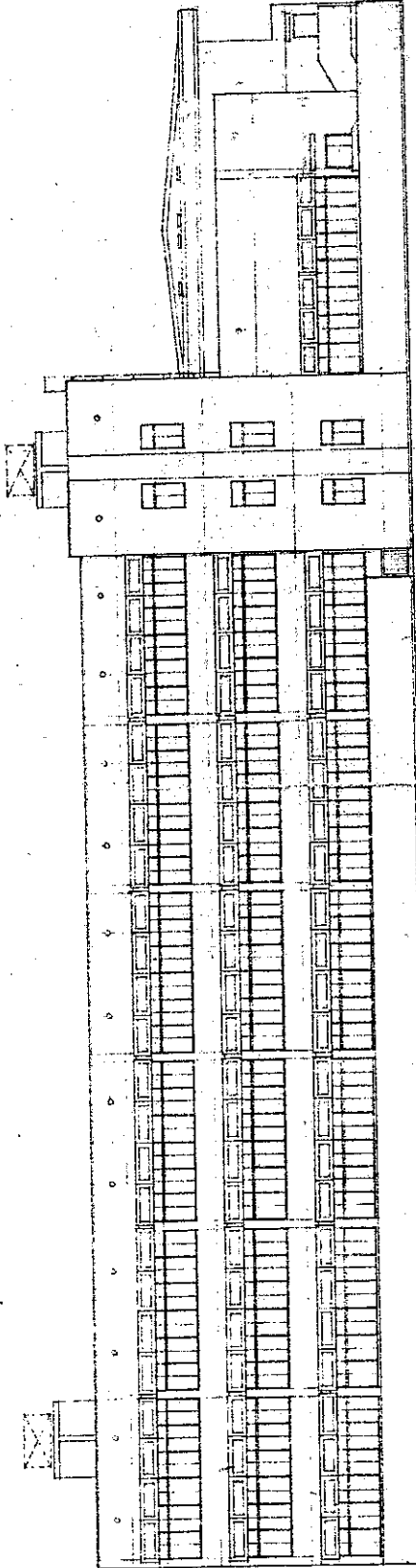
KTN-41

SECOND FLOOR PLAN

SCHOOL HALL BLOCK

NORTH CLASS ROOM BLOCK

6卷立圖

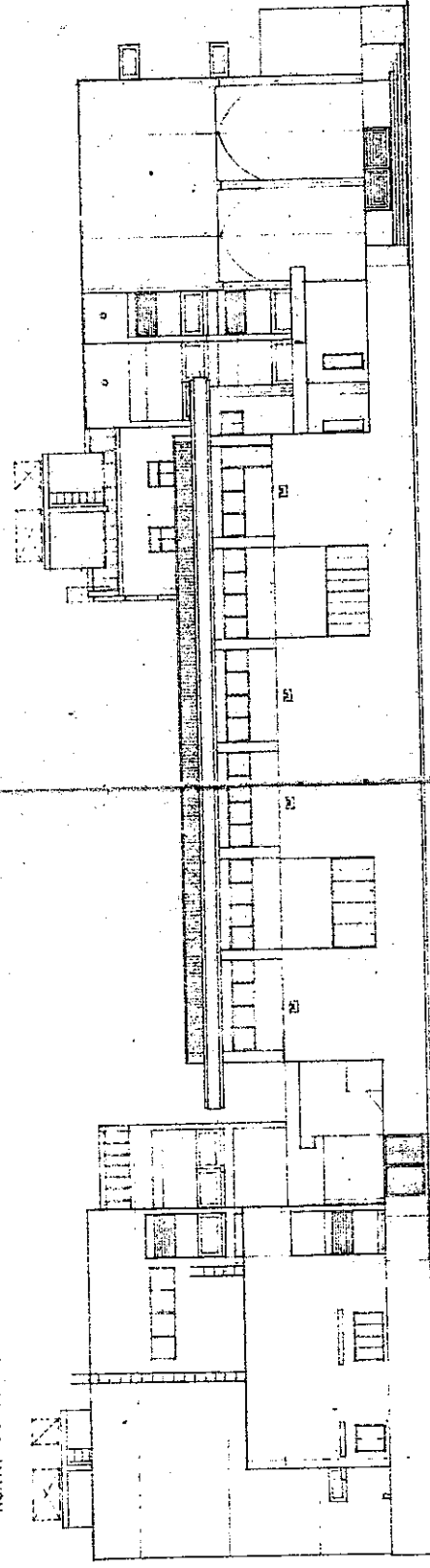


6卷立圖  
NORTH

SOUTH CLASS ROOM BLOCK

SCHOOL HALL BLOCK

NORTH CLASS ROOM BLOCK



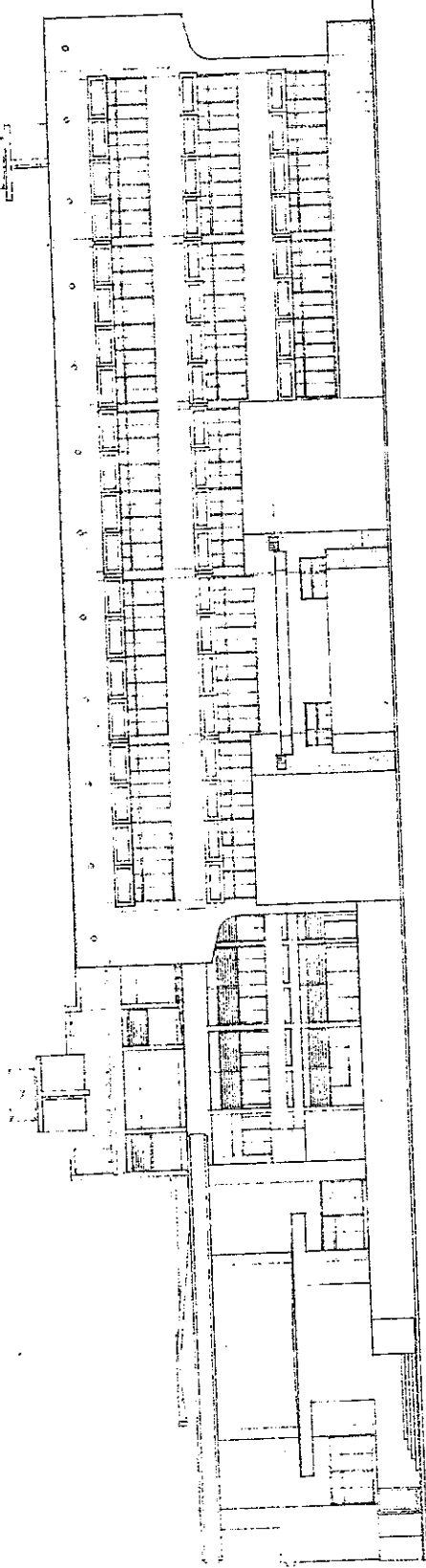
WEST

KTN-42

6号正房

SOUTH CLASS ROOM BLOCK

SCHOOL HALL BLOCK

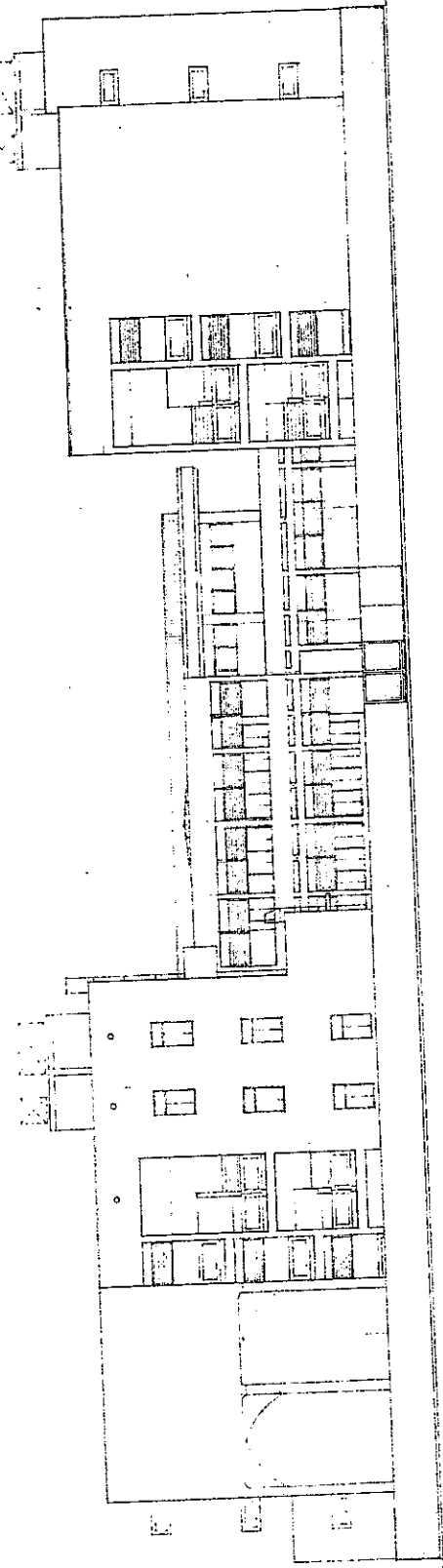


South

NORTH CLASS ROOM BLOCK

ADMIN BLOCK

SOUTH CLASS ROOM BLOCK



SCHOOL HALL BLOCK

NORTH CLASS ROOM BLOCK

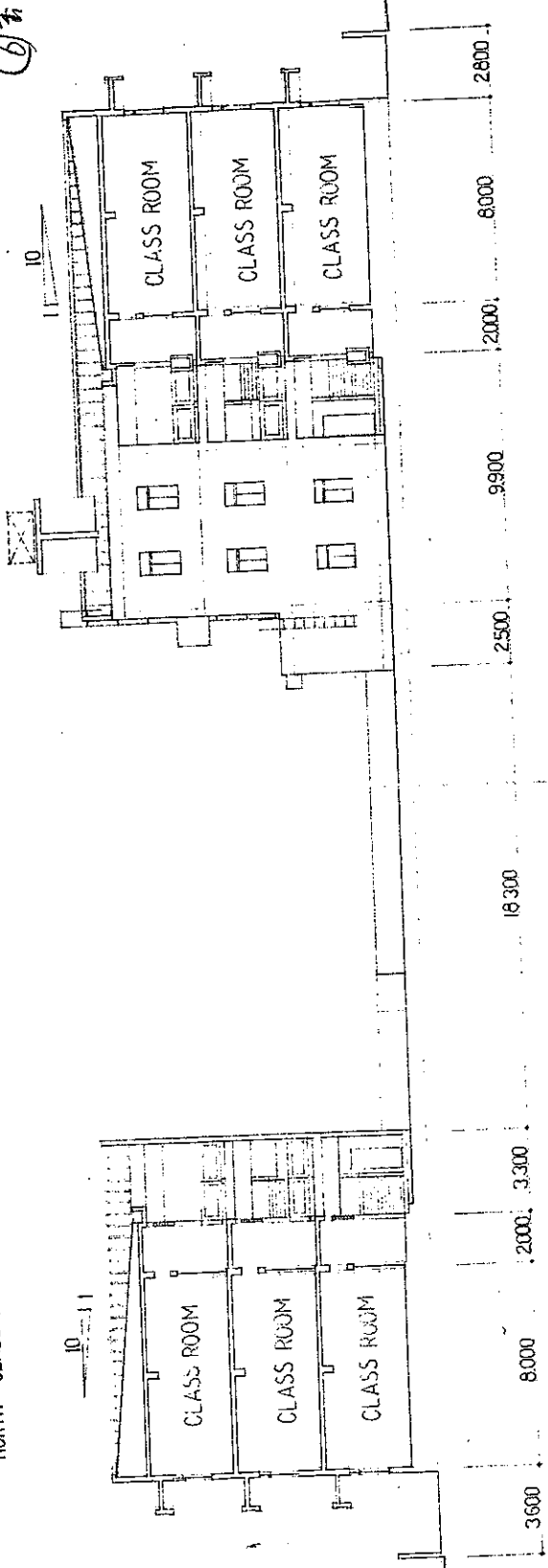
EFH

KTN-43

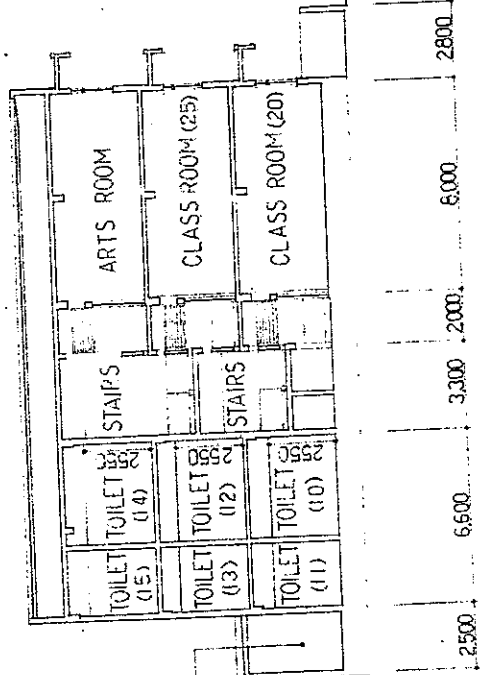
① 新教室

SOUTH CLASS ROOM BLOCK

NORTH CLASS ROOM BLOCK



SOUTH CLASS ROOM BLOCK



E SECTION

4  
A-2-8

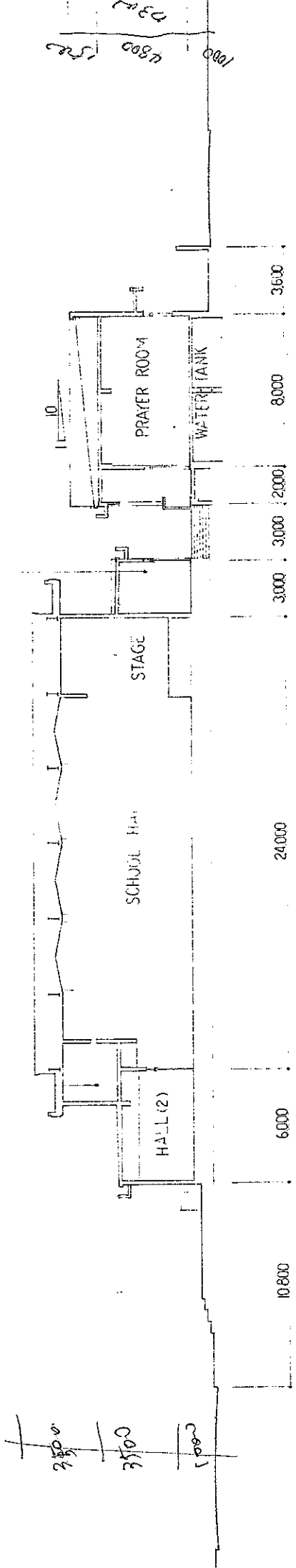
6\* (Handwritten note)

PROJECTION ROOM

JAHITOP'S ROOM

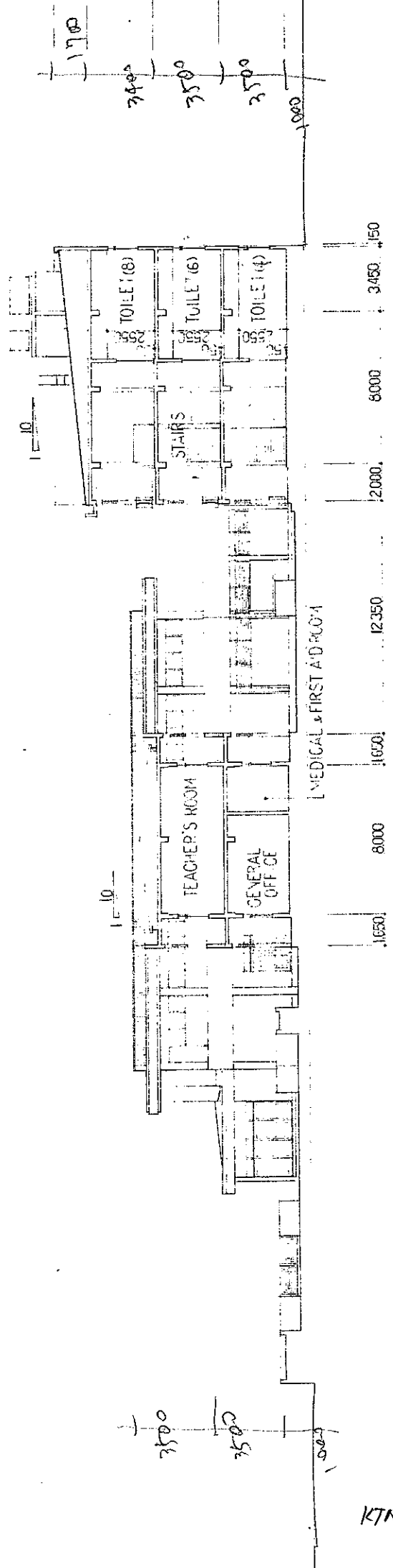
SCHOOL HALL BLOCK

NORTH CLASS ROOM BLOCK



ADMIN BLOCK

NORTH CLASS ROOM BLOCK



NORTH CLASS ROOM BLOCK

SOUTH CLASS ROOM BLOCK



KTN-45

⑥ 短計用

ホ-1417

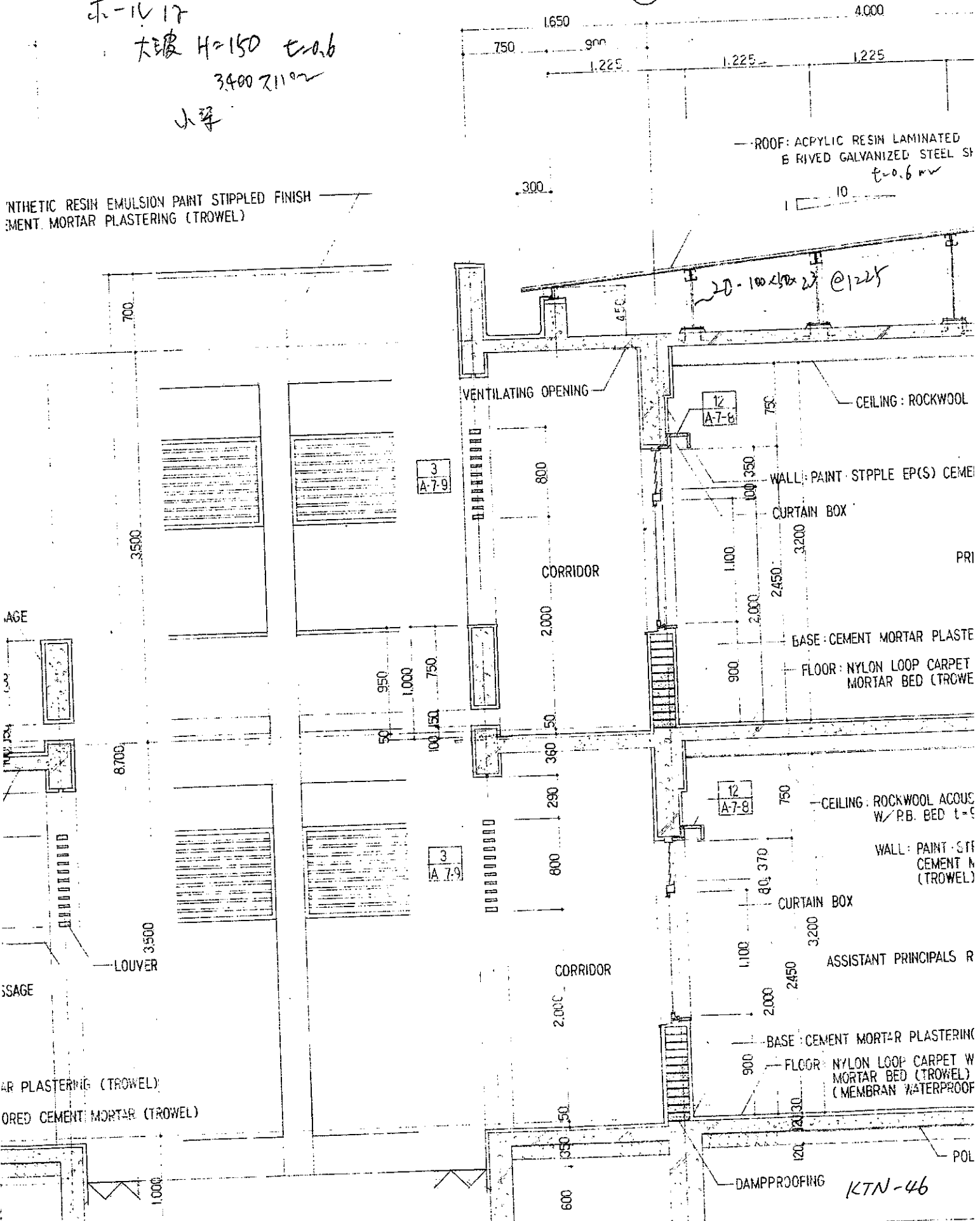
大波 H=150 t=0.6

3400 2110

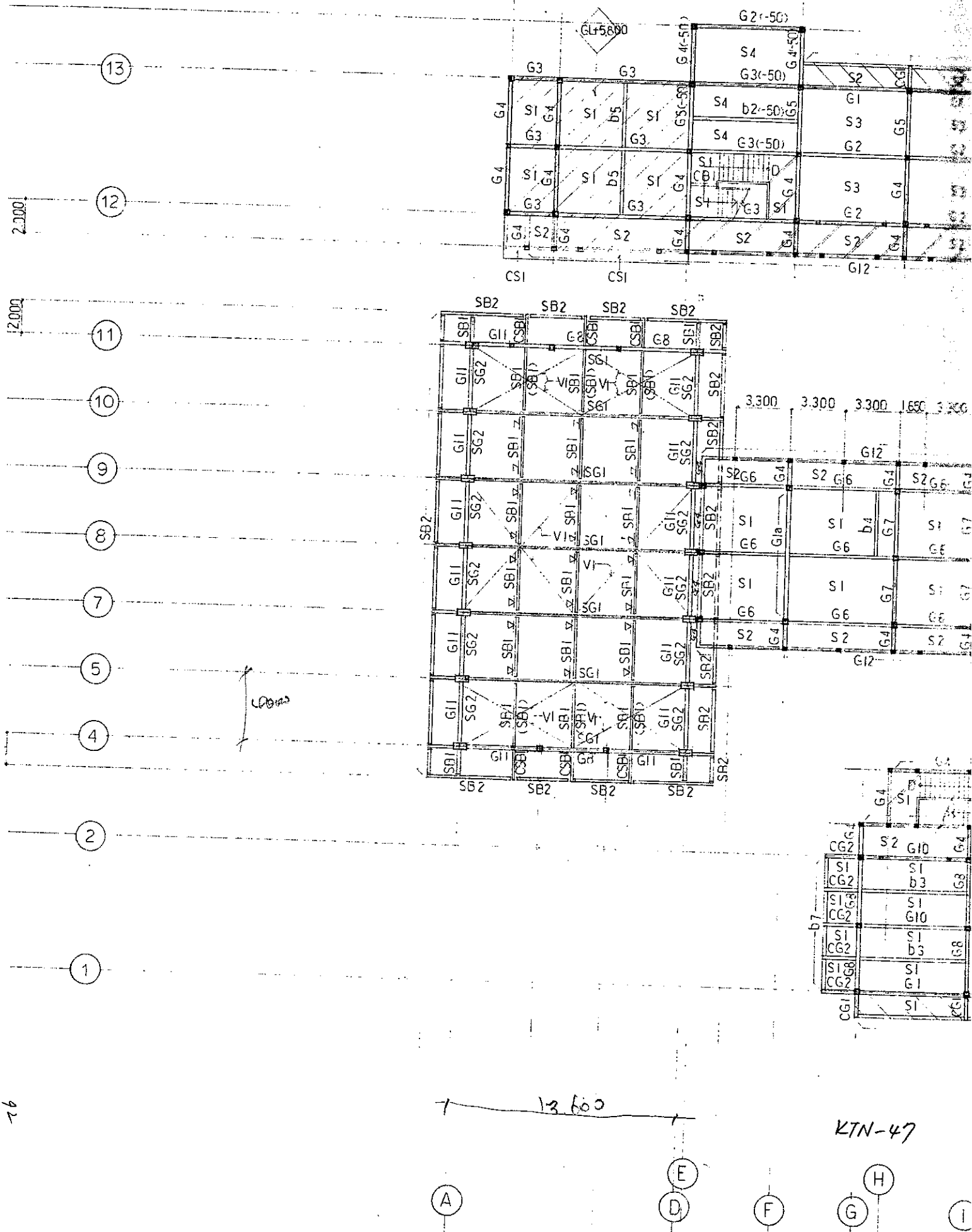
小波

ARTIFICIAL RESIN EMULSION PAINT STIPPLED FINISH  
CEMENT MORTAR PLASTERING (TROWEL)

⑦



② 木-IV  
S造層板

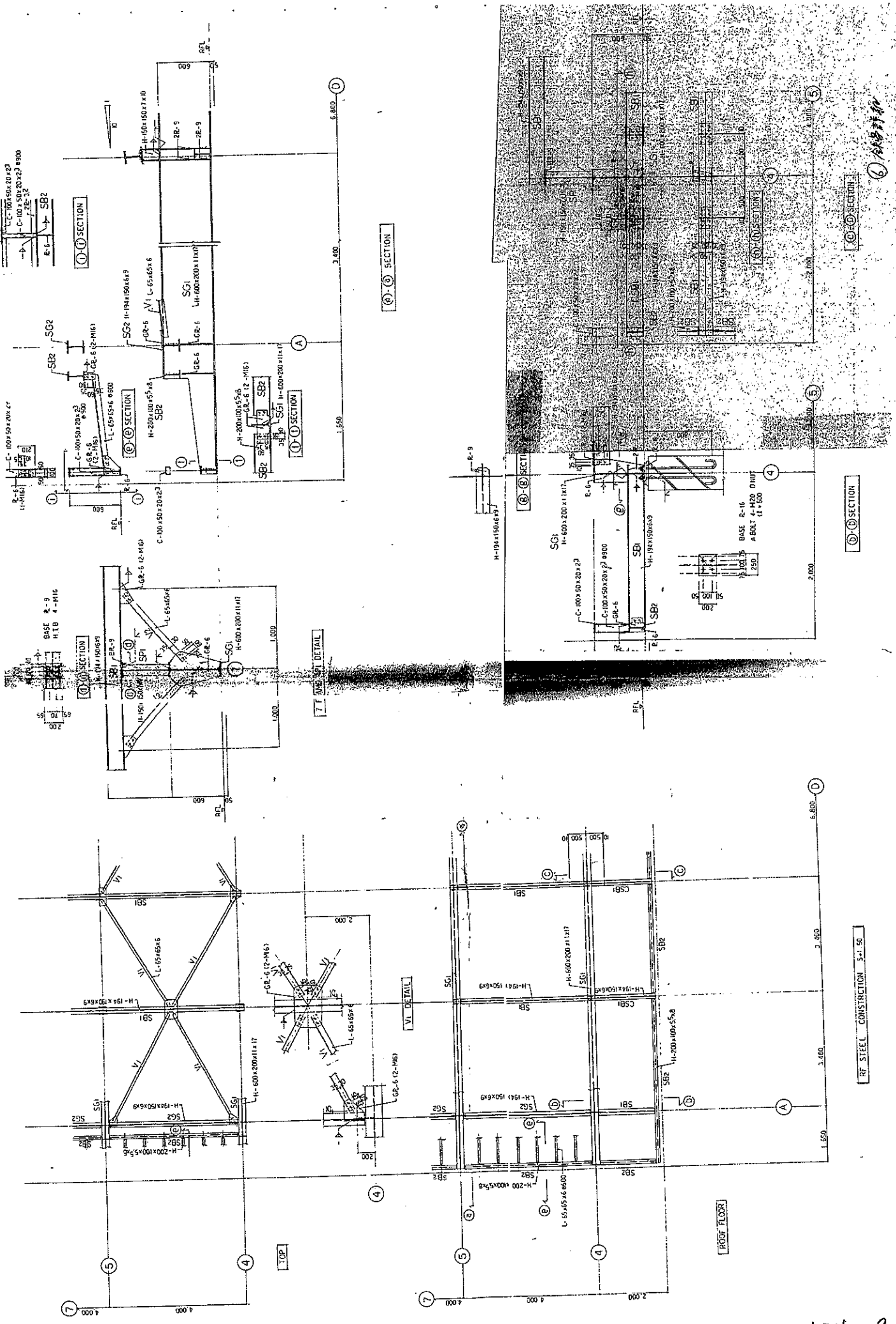


72

KTN-47



36



PROJECT FOR THE CONSTRUCTION OF THE PRIMARY SCHOOL IN MALE

RF STEEL CONSTRUCTION 5-1 50

RF STEEL CONSTRUCTION 5-1 50

DR STEEL CONSTRUCTION 5-1 50

KTN-48