Attachment-11

Structure Examination Document

STELCO BUILDING

Kalaafaanu School
Thaajuddeen School
New Secondary School for Girls

Center for Social Education

President Office

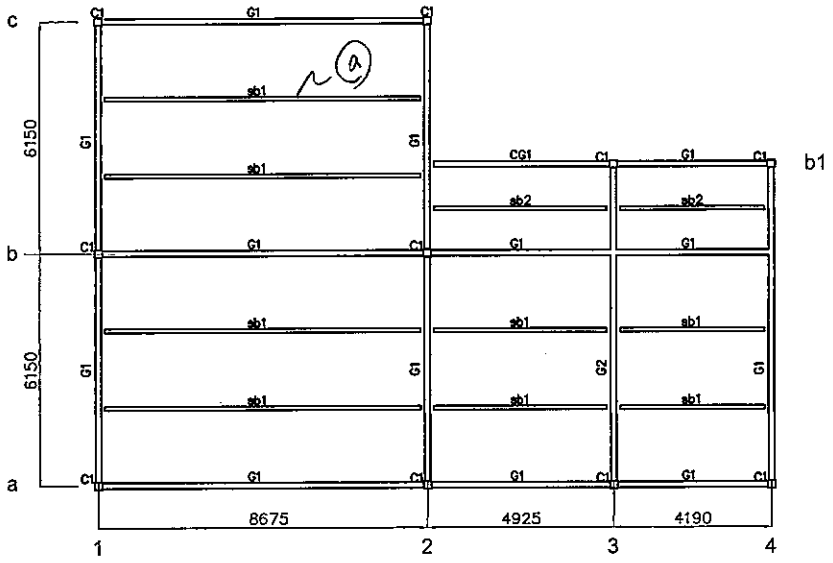
No. 1.

STELCO BUILDING.

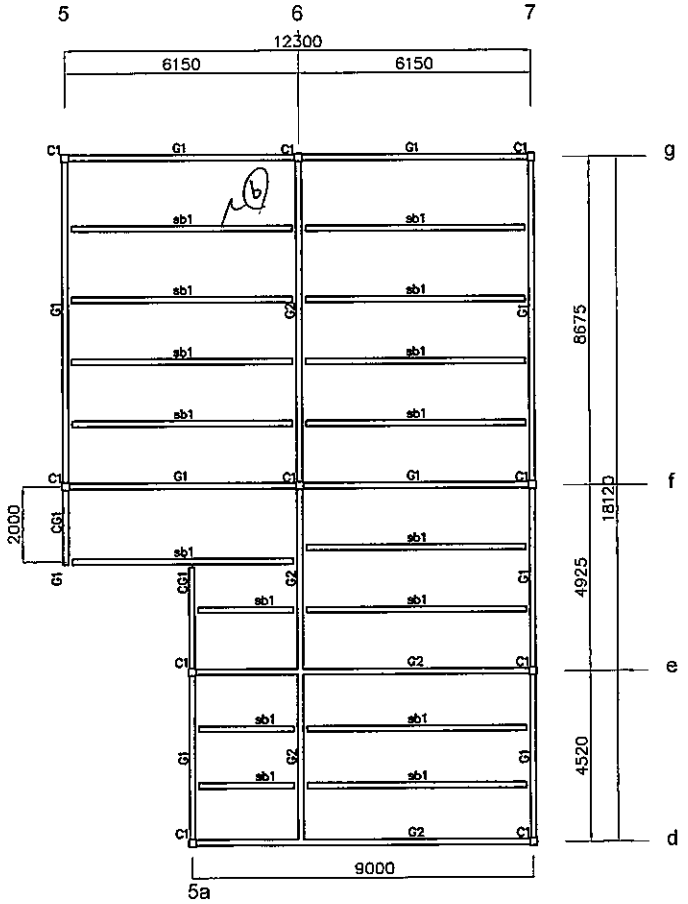
- PV panel and support frame : Weight is 0.5kN/㎡
- Steel frame member is designed (for PV panel)
- It is installed after foundation is made on the RC floor of the roof.
- Additional weight is added, and the member of the roof is examined.
- There is no problem in the safety because additional weight is 0.5kN/㎡ with the main structure member.

1、屋上取り付け鉄骨支持架台の設計

The design of the roof installation steel

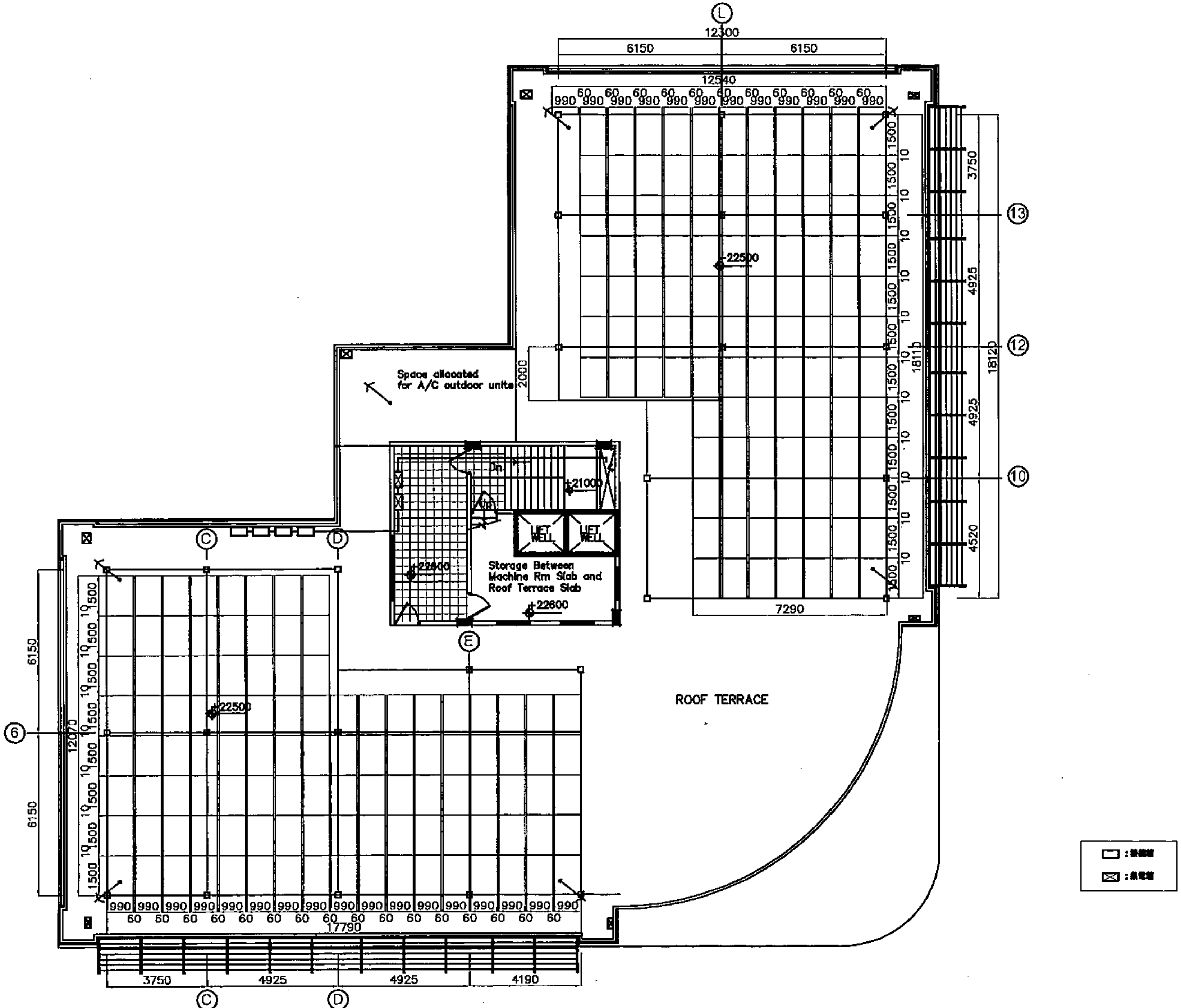


PLAN OF A-STRUCTORE



PLAN OF B-STRUCTORE

N



Roof Terrace Plan / Machine Room Plan

SB-2

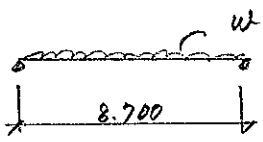
< Sub. Beam >.

Dead. Load.

PV. Panel + panel Frame. 500 N/m²

Solf. weight. 500 N/m

Type - ⓐ



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

Stress

$M = 1/8 \times 1.55 \times 8.7^{2} = 14.7\ kN\cdot m$

$Q = 1/2 \times 1.55 \times 8.7 = 6.8\ kN$

H-194×150×6×9 $I_x = 2630$ $Z_x = 271$ $l_b = 8700$.

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

$\sigma_b = \frac{14.7 \times 10^{3}}{271} = 55\ N/mm^2$ $\sigma_b/f_b = 0.78 < 1.0$ OK

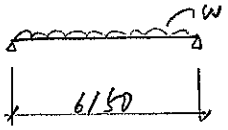
OK

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

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

OK

Type - ⓑ



$w = 0.5^{kN/m^2} \times 1.735^{m} + 0.5 = 1.37\ kN/m$

Stress

$M = 1/8 \times 1.37 \times 6.15^{2} = 6.5\ kN\cdot m$

$Q = 1/2 \times 1.37 \times 6.15 = 4.3\ kN$

H-188×99×4.5×7 $I_x = 1540$ $Z_x = 156$ $l_b = 6150$.

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

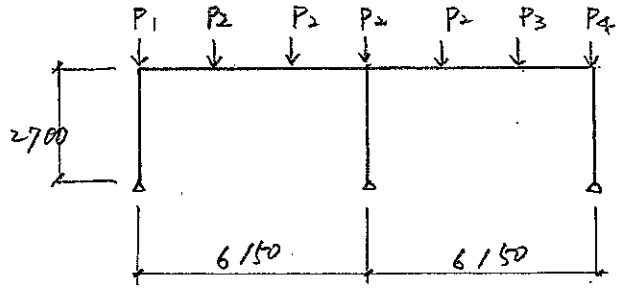
$\sigma_b = \frac{6.5 \times 10^{3}}{156} = 42$ $\sigma_b/f_b = 0.84 < 1.0$. OK

$\tau = \frac{43 \times 10^{3}}{184 \times 4.5} = 5.2 < 90$

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

OK

<Main Frame>



A-STRUCTURE
LINE 2

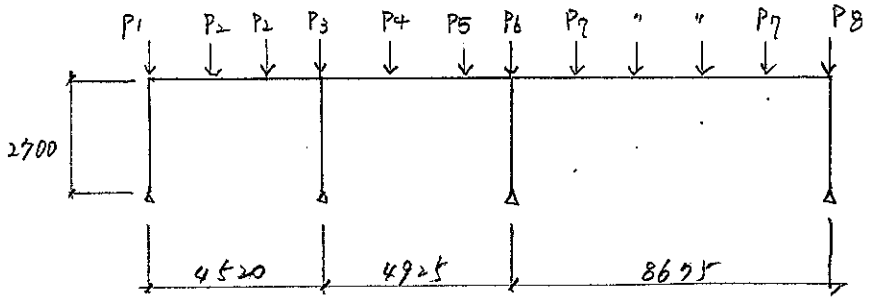
LOAD. Panel + frame. 500 kg/m²
beam + frame 1000 kg/m²
} 1.5 kN/m².

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

$P_2 = 1.5 \times 2.05^{m} = 21.^{kN}$

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

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



B-STRUCTURE
LINE-7.

LOAD. 1.5 kN/m².

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

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

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

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

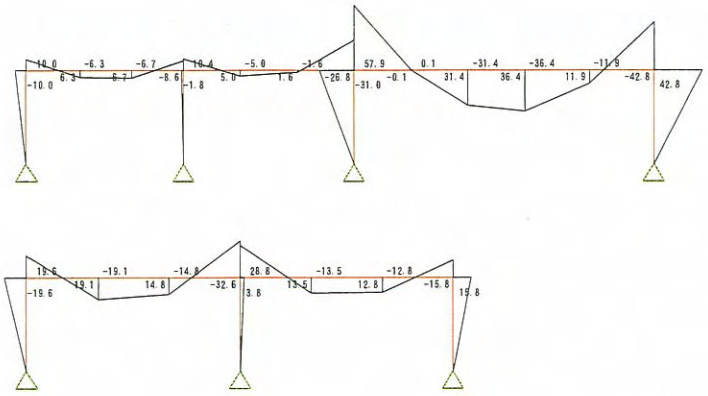
$P_5 = 1.5 \times 6.15 \times 1.65^{m} = 15.3^{kN}$

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

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

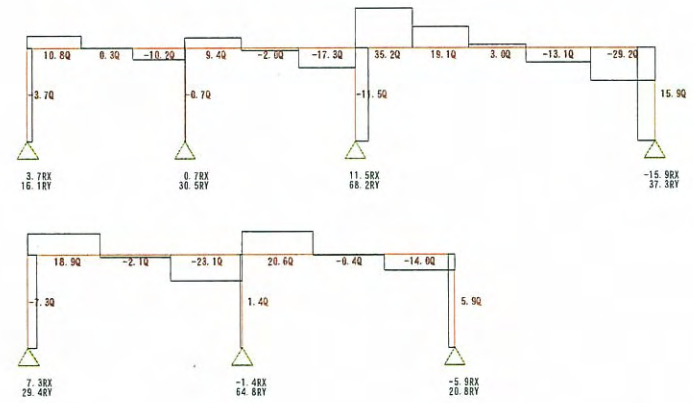
$P_8 = " \times 0.87 = 8.1^{kN}$

応力図 [DL]



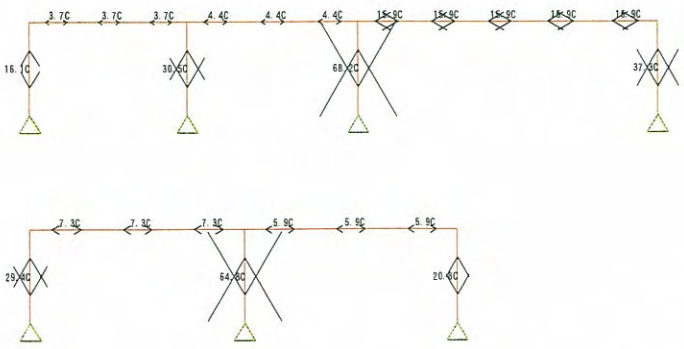
Bending Moment

応力図 [DL]



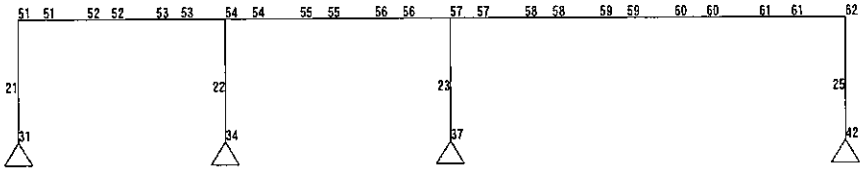
Shear

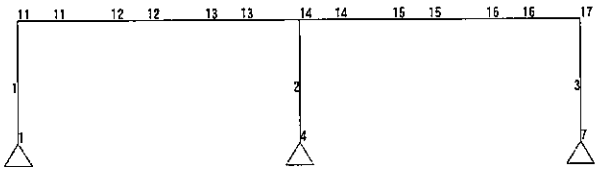
応力図 [DL]



Axial

SB-5


51 51 52 52 53 53 54 54 55 55 56 56 57 57 58 58 59 59 60 60 61 61 62
21 22 23 25
31 34 37 42


11 11 12 12 13 13 14 14 15 15 16 16 17
1 2 3
1 4 7

SB-6

【基本事項・計算条件】

工　事　名：STELCO ROOF STRUCTURE
略　　称：MOSTEL-11
日　　付：2009/06/11
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　：無
・バネ材の使用　：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
・接合部ﾊﾟﾈﾙ変形の考慮　：しない
・剛域・ﾊﾟﾈﾙの軸変形の考慮　：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
・分布ﾊﾞﾈ　：無

・出力単位　：ＳＩ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方向ﾊﾞﾈ	Ｙ方向ﾊﾞﾈ	回転ﾊﾞﾈ
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／mm2]

No	E	G
1	205.00	79.00

【断面性能】

No	A [cm2]	I [cm4]	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	節点No j端	断面No	材質No	結合No i端	結合No j端	剛域 [cm] i端	剛域 [cm] 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	P1	P2	P3	P4	P5	P6
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

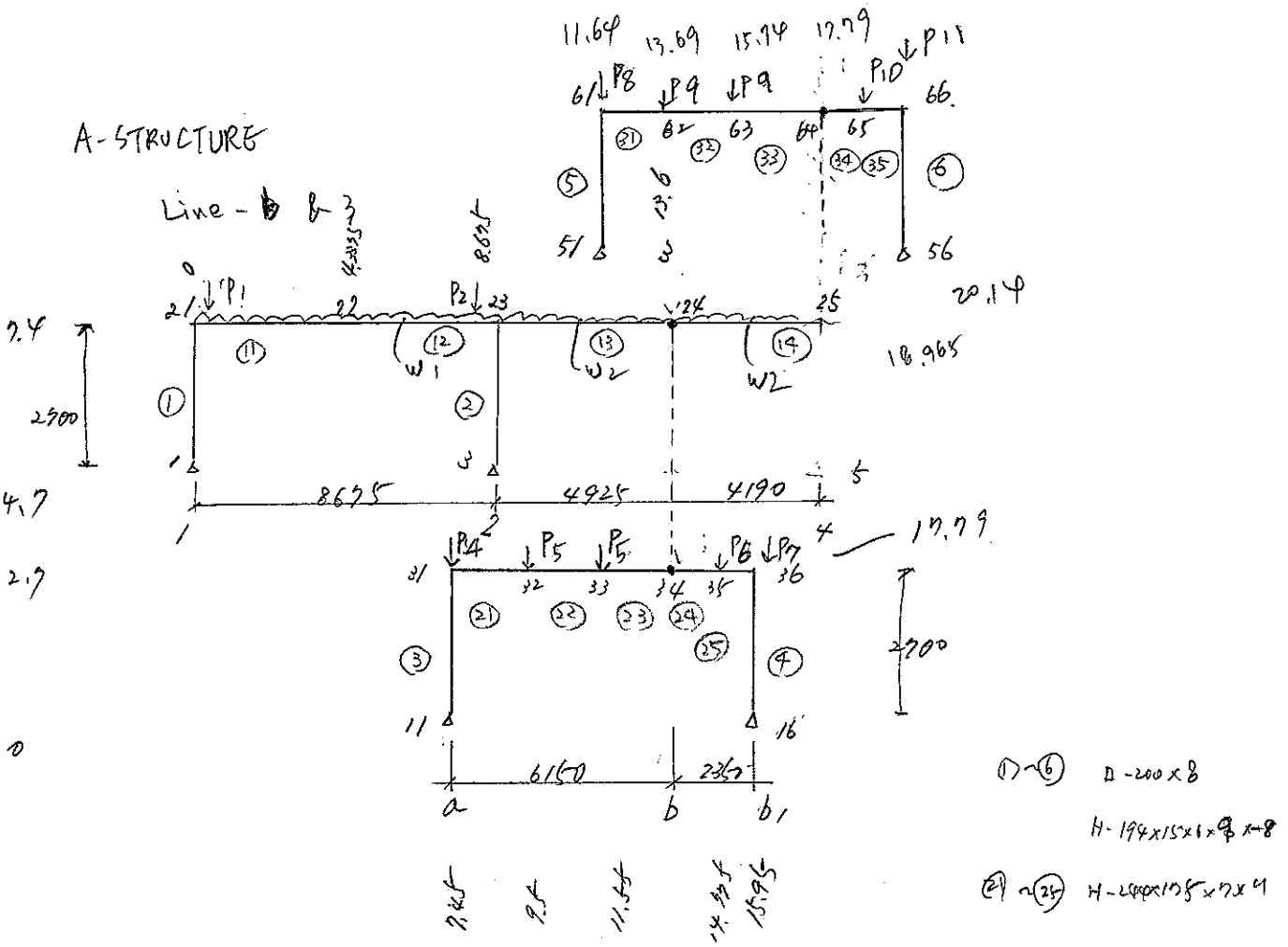
節点No	δx [cm]	δy [cm]	θ [rad]
1	0.000000	0.000000	0.00087968
4	0.000000	0.000000	-0.00050488
7	0.000000	0.000000	-0.00120866
11	0.080401	-0.006534	-0.00274594
12	0.078493	-0.878471	-0.00284967
13	0.076585	-0.768492	0.00359741
14	0.074677	-0.014396	0.00019809
15	0.073139	-0.598397	-0.00271426
16	0.071600	-0.635869	0.00229377
17	0.070062	-0.004615	0.00171400
31	0.000000	0.000000	0.00143015
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
52	-0.224480	-0.183477	-0.00094818
53	-0.225197	-0.191304	0.00087447
54	-0.225913	-0.006789	0.00061679
55	-0.226829	-0.054870	-0.00019961
56	-0.227749	0.013660	0.00081253
57	-0.228666	-0.015157	-0.00302428
58	-0.231996	-1.544899	-0.01185222
59	-0.235337	-3.270676	-0.00706816
60	-0.238668	-3.610155	0.00325325
61	-0.242476	-2.050118	0.01165101
62	-0.246284	-0.008286	0.00625369

【部材応力】

※※ 荷重ケース 1 ※※ DL

部材No	節点No i端	節点No j端	M [kNm] i端	M [kNm] 中央	M [kNm] j端	Q [kN] i端	Q [kN] j端	N [kN] i端	N [kN] 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. $1.5\ kN/m^2$

$W_1 = 1.5 \times 2.05^{m} = 3.08\ kN/m$ $\quad W_2 = 1.5 \times (1.025 + 0.5875) = 2.42\ kN/m$

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

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

P_3 = Noeking

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

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

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

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

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

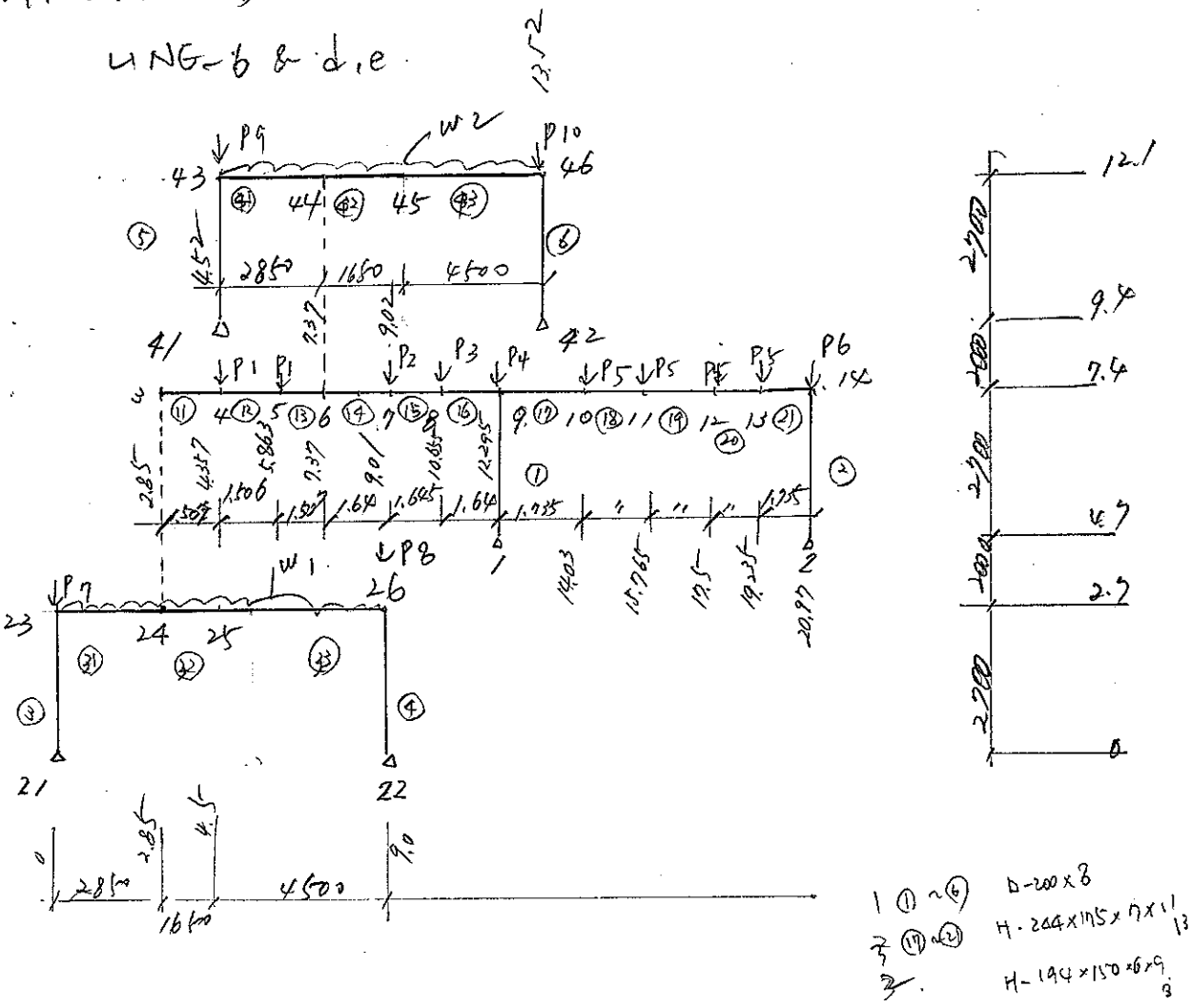
$P_9 = 1.5 \times 2.05 \times 2.095 = 6.5$

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

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

STRUCTURE -B

LINE-b & d,e



LOAD

$w_{l1} = 1.5\,kN/m^2 \times 0.754 = 1.14\,kN/m$

$w_{l2} = 1.5\,kN/m^2 \times 1.58^{m} = 2.37\,kN/m$

$P_1 = 1.5 \times (1.507 \times 4.5) = 10.2\,kN$

$P_5 = 1.5 \times 1.735 \times 6.15 = 16.1\,kN$

$P_2 = 1.5 \times 1.641 \times 4.5 = 11.1\,kN$

$P_6 = 1.5 \times 0.868 \times 6.15 = 8.1\,kN$

$P_3 = 1.5 \times 1.641 \times 6.15 = 15.2\,kN$

$P_7 = 1.5 \times 1.507 \times 1.425 = 3.23\,kN$

$P_4 = 1.5 \times 1.69 \times 6.15 = 15.6\,kN$

$P_8 = 1.5 \times 1.507 \times 3.075 = 7.0\,kN$

$P_9 = P_8 + 1.5 \times 1.641 \times 1.425 = 6.8\,kN$

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

【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
・バネ材の使用　：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
・接合部ﾊﾟﾈ変形の考慮　：しない
・剛域・ﾊﾟﾈの軸変形の考慮　：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
・分布ﾊﾞﾈ　：無

・出力単位　：ＳＩ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	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			

【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方向ﾊﾞﾈ	Ｙ方向ﾊﾞﾈ	回転ﾊﾞﾈ
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	節点No. <1>	<2>	<3>	同一変位
1	24	34		Y
2	25	64		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
2	38.11	2625	3.61	H-194*150*6*9*8
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	節点No i端	節点No j端	断面No	材質No	結合No i端	結合No j端	剛域 [cm] i端	剛域 [cm] 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

【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				

【部材荷重】

※※ 荷重ケース 1 ※※ DL

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

部材No	節点No i端	節点No j端	M [kNm] i端	M [kNm] Mo	M [kNm] j端	Q [kN] i端	Q [kN] j端	N [kN] i端	N [kN] j端
31	61	62	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
33	63	64	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
35	65	66	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]
1	4.1	38.5	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
56	-5.9	13.7	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]
1	0.000000	0.000000	-0.00116558
3	0.000000	0.000000	-0.00246230
11	0.000000	0.000000	0.00155786
16	0.000000	0.000000	-0.00162902
21	0.492016	-0.008565	-0.00318767
22	0.489764	-1.187946	0.00086993
23	0.487512	-0.014017	-0.00044021
24	0.487512	-1.039964	-0.00140454
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
51	0.000000	0.000000	0.00108685
56	0.000000	0.000000	-0.00079658
61	-0.035983	-0.003025	-0.00184940
62	-0.037528	-0.753361	-0.00388291
63	-0.039074	-1.253285	-0.00040806
64	-0.040619	-0.893803	0.00349981
65	-0.041505	-0.415723	0.00409678
66	-0.042390	-0.003047	0.00213967

【部材応力】

※※ 荷重ケース 1 ※※ DL

部材No	節点No i端	節点No j端	M [kNm] i端	M [kNm] 中央	M [kNm] j端	Q [kN] i端	Q [kN] j端	N [kN] i端	N [kN] 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
・バネ材の使用　：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
・接合部ﾊﾟﾈ変形の考慮　：しない
・剛域・ﾊﾟﾈの軸変形の考慮　：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
・分布ﾊﾞﾈ　：無

・出力単位　：ＳＩ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	節点No. <1>	<2>	<3>	Ｘ方向ﾊﾞﾈ	Ｙ方向ﾊﾞﾈ	回転ﾊﾞﾈ
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	節点No. <1>	<2>	<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	節点No i端	節点No j端	断面No	材質No	結合No i端	結合No j端	剛域 [cm] i端	剛域 [cm] 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	節点No i端	節点No j端	M [kNm] i端	M [kNm] Mo	M [kNm] j端	Q [kN] i端	Q [kN] j端	N [kN] i端	N [kN] j端
1	1	9	0.0	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	0.0
3	21	23	0.0	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	0.0
5	41	43	0.0	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	0.0
11	3	4	0.0	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	0.0
13	5	6	0.0	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	0.0

部材No	節点No i端	節点No j端	M [kNm] i端	M [kNm] Mo	M [kNm] j端	Q [kN] i端	Q [kN] j端	N [kN] i端	N [kN] 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]
1	9.3	76.3	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
42	-7.7	29.1	0.0
合計	0.0	198.0	0.0

【節点変位】

※※ 荷重ケース 1 ※※ DL

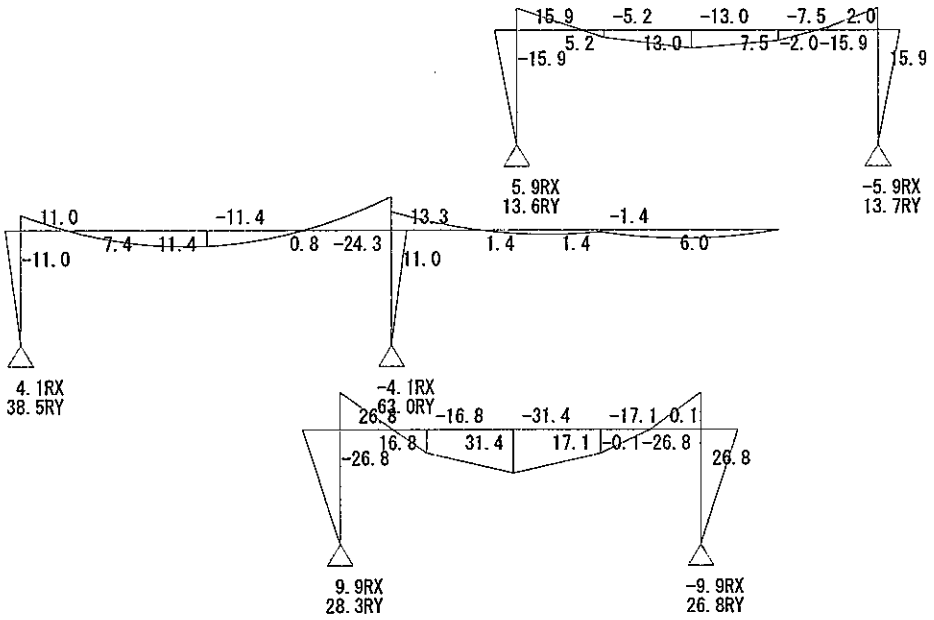
節点No	δx [cm]	δy [cm]	θ [rad]
1	0.000000	0.000000	0.00408974
2	0.000000	0.000000	0.00110478
3	-0.697715	-0.736762	-0.00284361
4	-0.697715	-1.127856	-0.00182779
5	-0.697715	-1.247303	0.00028231
6	-0.697715	-1.071184	0.00161775
7	-0.697715	-0.750117	0.00244560
8	-0.697715	-0.292828	0.00267732
9	-0.697715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

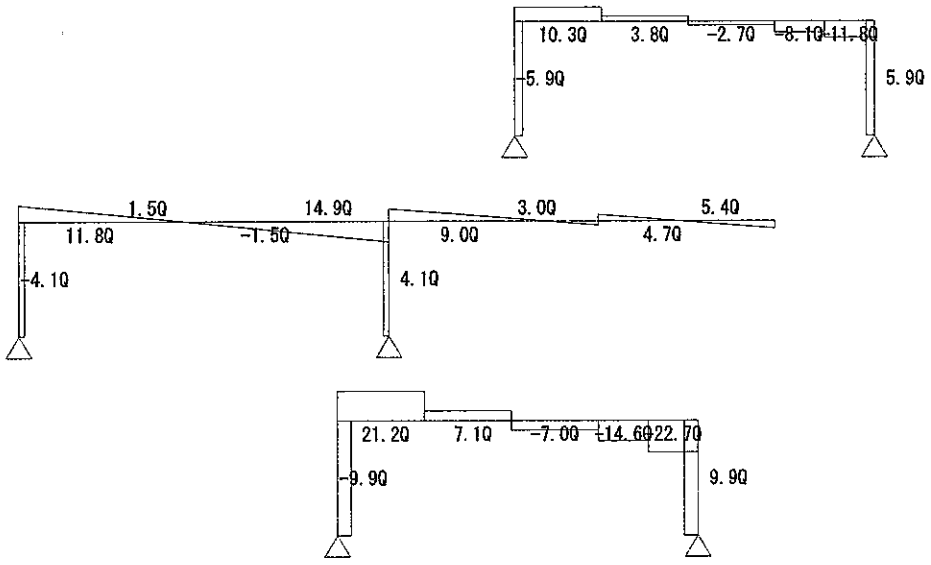
【部材応力】

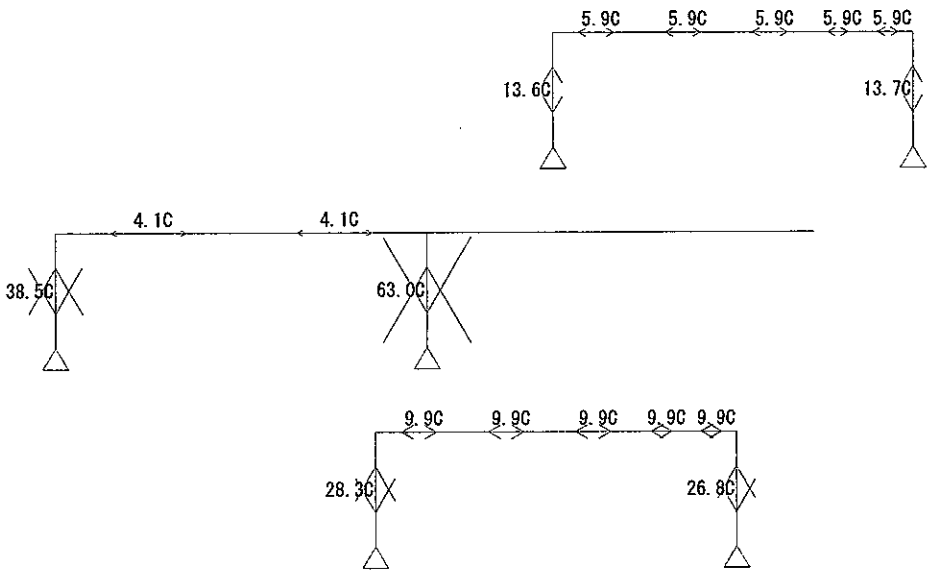
※※ 荷重ケース 1 ※※ DL

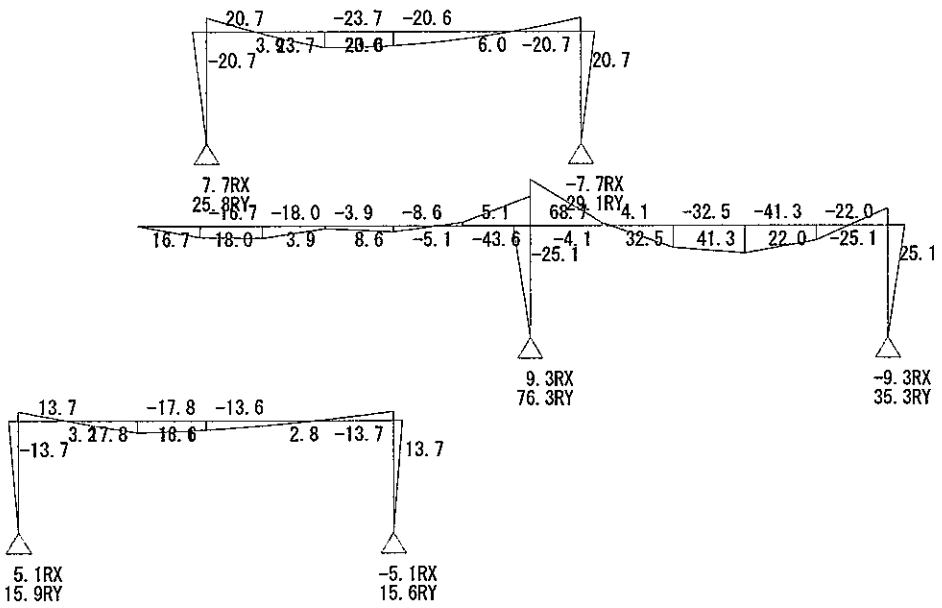
部材No	節点No i端	節点No j端	M [kNm] i端	M [kNm] 中央	M [kNm] j端	Q [kN] i端	Q [kN] j端	N [kN] i端	N [kN] j端
1	1	9	0.0	-12.6	-25.1	-9.3	9.3	76.3	-76.3
2	2	14	0.0	12.6	25.1	9.3	-9.3	35.3	-35.3
3	21	23	0.0	-6.9	-13.7	-5.1	5.1	15.9	-15.9
4	22	26	0.0	6.9	13.7	5.1	-5.1	15.6	-15.6
5	41	43	0.0	-10.3	-20.7	-7.7	7.7	25.8	-25.8
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	節点No i端	節点No j端	M [kNm] i端	M [kNm] 中央	M [kNm] j端	Q [kN] i端	Q [kN] j端	N [kN] i端	N [kN] 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

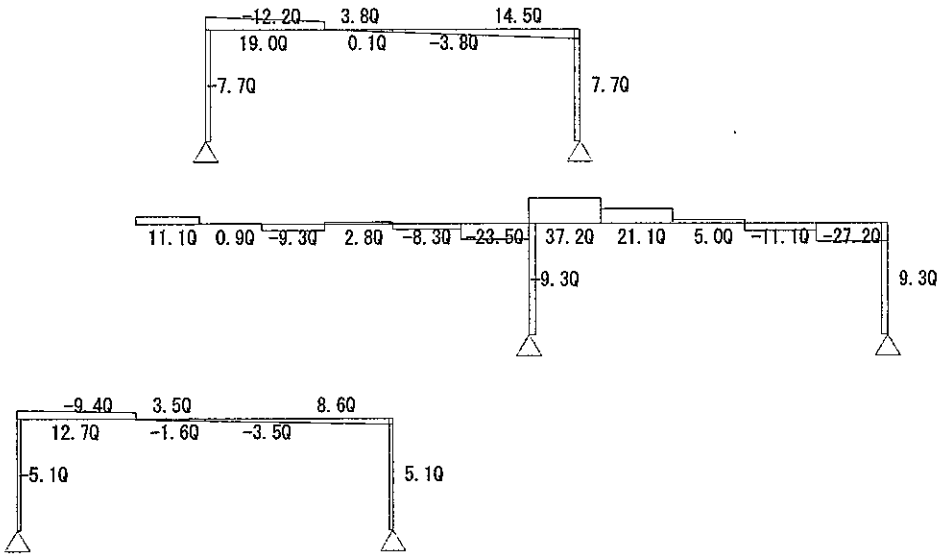

15.9
-5.2
-13.0
-7.5
2.0
5.2
13.0
7.5
-2.0
-15.9
-15.9
15.9
5.9RX
13.6RY
-5.9RX
13.7RY
11.0
-11.4
13.3
-1.4
7.4
11.4
0.8
-24.3
1.4
1.4
6.0
-11.0
11.0
4.1RX
38.5RY
-4.1RX
63.0RY
26.8
-16.8
-31.4
-17.1
0.1
16.8
31.4
17.1
-0.1
-26.8
-26.8
26.8
9.9RX
28.3RY
-9.9RX
26.8RY

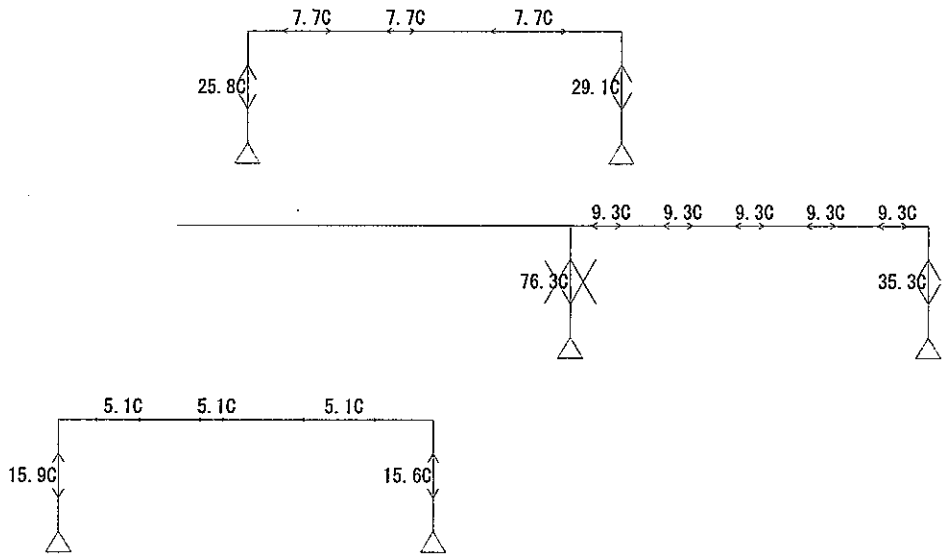

10.3Q
3.8Q
-2.7Q
-8.1Q
-11.8Q
5.9Q
5.9Q
1.5Q
14.9Q
3.0Q
5.4Q
11.8Q
-1.5Q
9.0Q
4.7Q
4.1Q
4.1Q
21.2Q
7.1Q
-7.0Q
-14.6Q
-22.7Q
9.9Q
9.9Q


5.9C
5.9C
5.9C
5.9C
5.9C
13.6C
13.7C
4.1C
4.1C
38.5C
63.0C
9.9C
9.9C
9.9C
9.9C
9.9C
28.3C
26.8C


20.7
-23.7
-20.6
-20.7
6.0
-20.7
20.7
7.7RX
25.8RY
-7.7RX
29.1RY
-16.7
-18.0
-3.9
-8.6
5.1
68.7
4.1
-32.5
-41.3
-22.0
16.7
18.0
3.9
8.6
-5.1
-43.6
-4.1
32.5
41.3
22.0
-25.1
25.1
-25.1
9.3RX
76.3RY
-9.3RX
35.3RY
13.7
-17.8
-13.6
-13.7
2.8
-13.7
13.7
5.1RX
15.9RY
-5.1RX
15.6RY

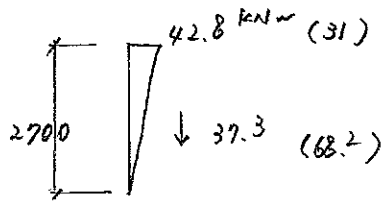
SB-22


-12.2Q
3.8Q
14.5Q
19.0Q
0.1Q
-3.8Q
7.7Q
7.7Q
11.1Q
0.9Q
-9.3Q
2.8Q
-8.3Q
-23.5Q
37.2Q
21.1Q
5.0Q
-11.1Q
-27.2Q
9.3Q
9.3Q
-9.4Q
3.5Q
8.6Q
12.7Q
-1.6Q
-3.5Q
5.1Q
5.1Q


7.7C
7.7C
7.7C
25.8C
29.1C
9.3C
9.3C
9.3C
9.3C
9.3C
76.3C
35.3C
5.1C
5.1C
5.1C
15.9C
15.6C

Member design

< Colum >. ↓ Ref. SB-5



□-200×200×8 $Z_x = 357$ $i_y = 7.76$ $A = 59.24$

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

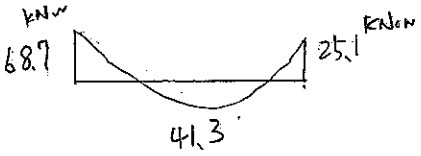
$f_c = 133\ N/mm^2$ $f_b = 157\ N/mm^2$

$\sigma_b = \frac{42.8 \times 10^3}{357} = 120$ (31) (87) $\sigma_b/f_b = 0.77$ (0.56)

$\sigma_c = \frac{37.3 \times 10^3}{5924} = 6.3$ (68.2) (1.2) $\sigma_c/f_c = 0.05$ (0.1)

(0.68). 0.82 < 1.0 OK

< Girder > ↓ Ref. SB-22



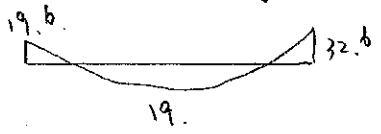
H-244×175×7×11 $Z_x = 495$ $l_b = 2100$

$f_b = \frac{89000 \times 175 \times 11}{2100 \times 2449} = 334 \rightarrow 157$

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

OK

↓ Ref. SB-5

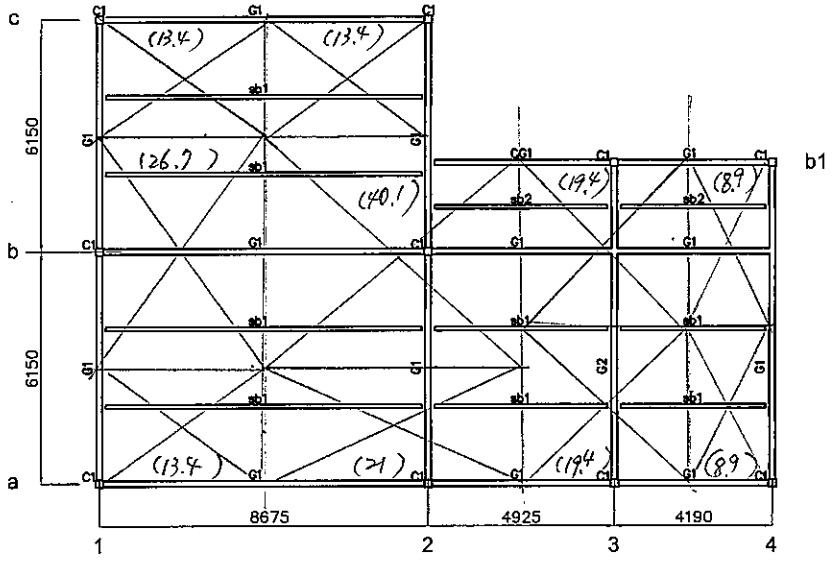


H-194×150×6×9 $Z_x = 271$ $l_b = 2100$

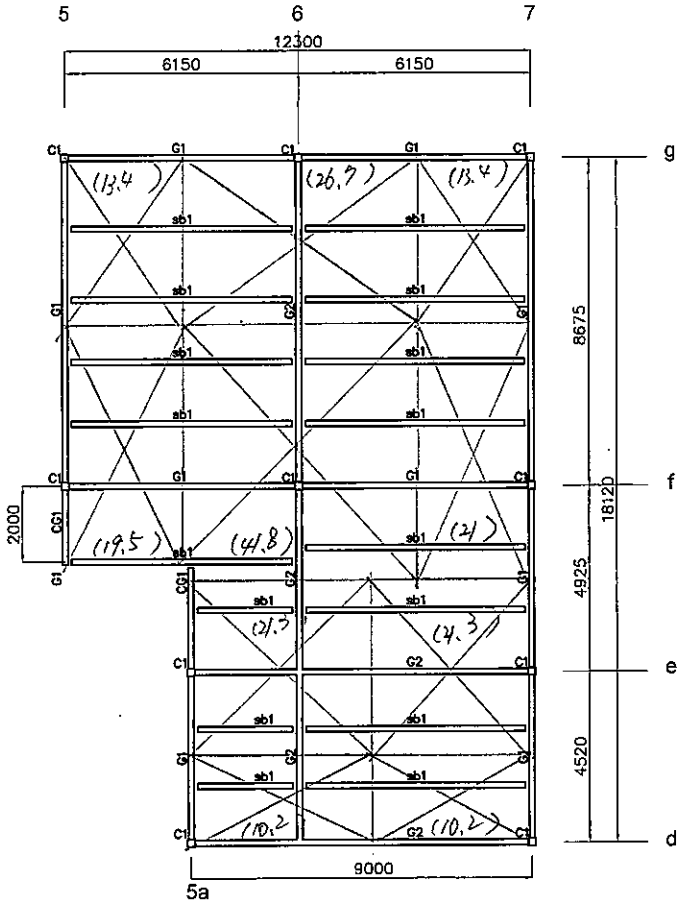
$\sigma_b = \frac{32.6 \times 10^3}{271} = 121$ $\sigma_b/f_b = 0.77 < 1.0$

OK

Area



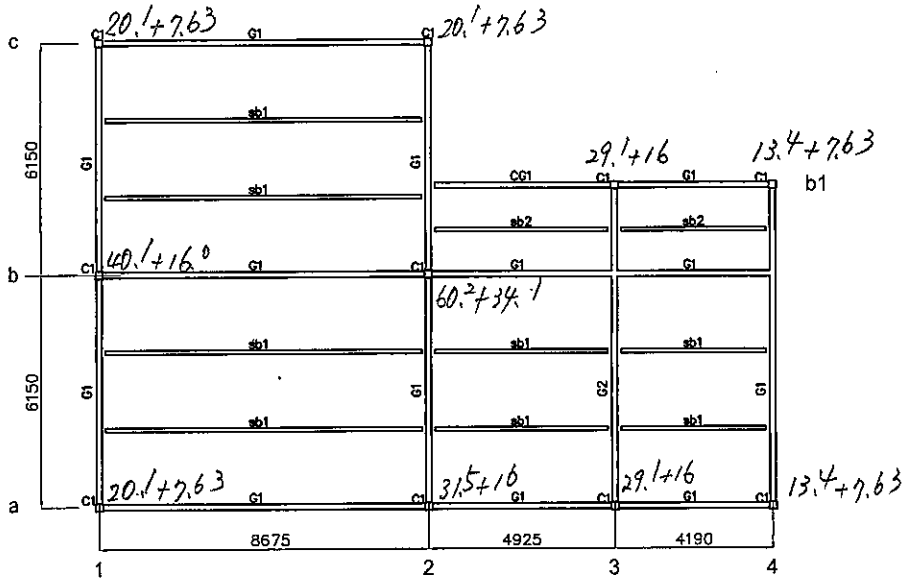
PLAN OF A-STRUCTURE



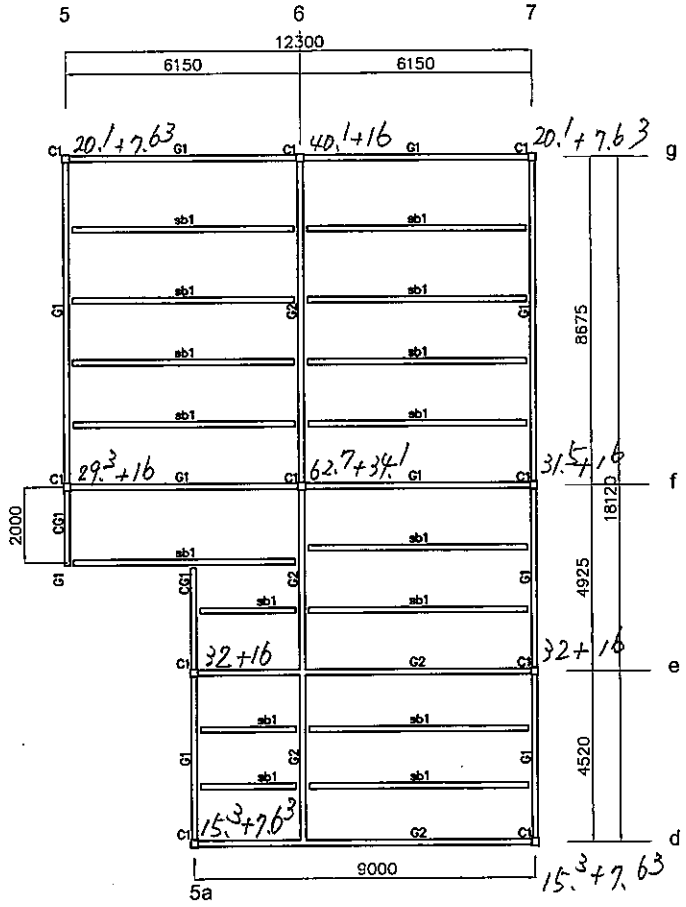
PLAN OF B-STRUCTURE

27

SB-26



PLAN OF A-STRUCTURE



PLAN OF B-STRUCTURE

SB-27

Wind Load.

$V_0 = 40\ m/sec$

$Z_b = 5\ m$ $\quad G_f = 2.1$

$Z_G = 450\ m$

$\alpha = 0.2$

$$E_r = 1.7 \times (H/Z_G)^{\alpha}$$
$$= 1.7 \times (36/450)^{0.2}$$
$$= 1.03$$

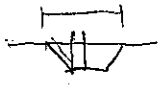
$$E = 1.03^2 \times G_f \quad = 1.03^2 \times 2.1$$
$$= 2.23$$

$$q = 0.6 \times E \times V_0^2$$
$$= 0.6 \times 2.23 \times 40^2 = 2141 \Rightarrow 2200\ N/m^2$$

Self weight $= 1500\ N/m^2$

Up Lift $= 2.2 - 1.5 = 0.7\ kN/m^2$

M20 Anchor



Ac

$A_c = 6^2 \times \pi = 113\ cm^2$

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

$8 - M20 = 1.12 \times 8 = 8.96\ kN$

Foundation Self weight

$1.0 \times 1.0 \times 0.6 \times 24 = 14.4\ kN$

Area 28 m² × 0.7 = 19.6 kN.

Foundation $0.65^2 \times \pi \times 0.5 \times 24 = 16.0$ kN.
Anchor 8 kN
} 24.0 kN

24.0 / 1.2 = 20 kN.

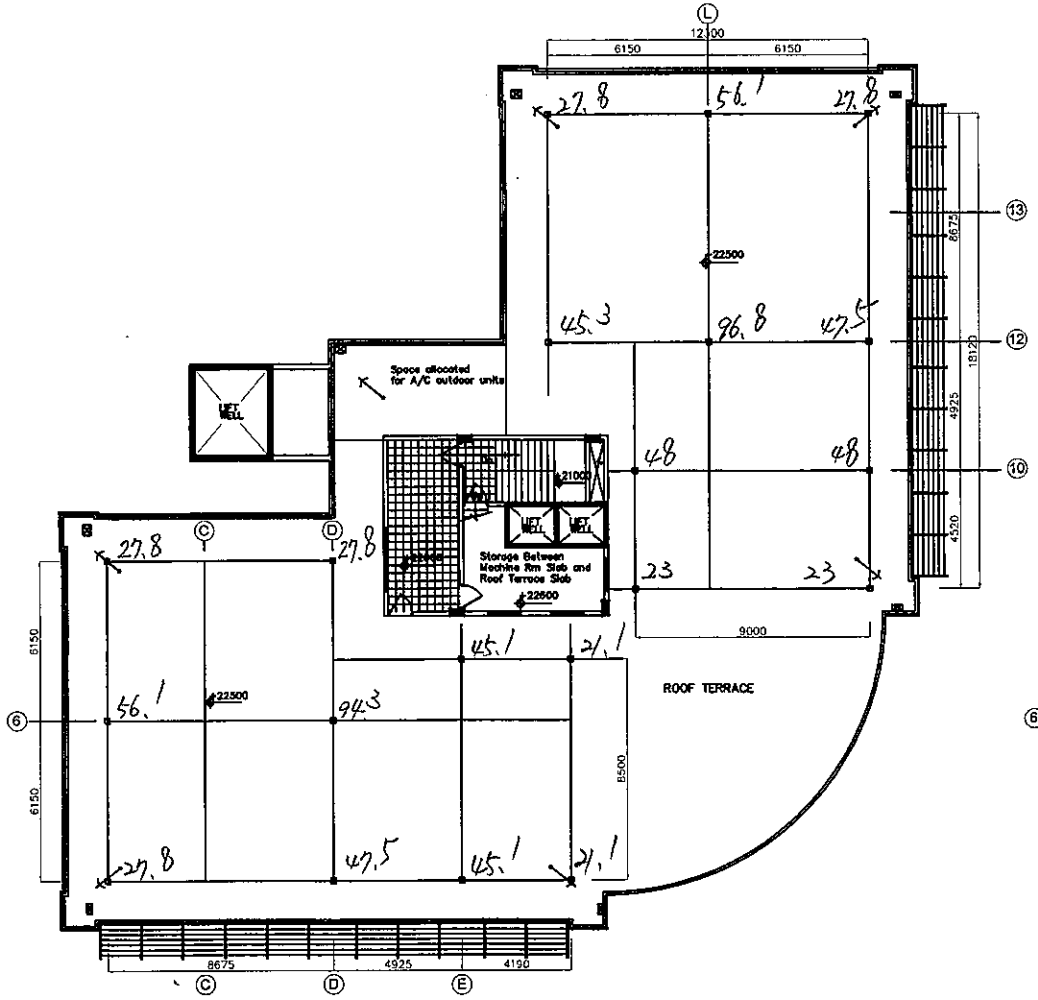
20 / 0.7 = 28.6 m²

Area 14.6 × 0.7 = 10.3 kN

Foundation $0.45^2 \times \pi \times 0.5 \times 24 = 7.63$
Anchor 8
} 15.63

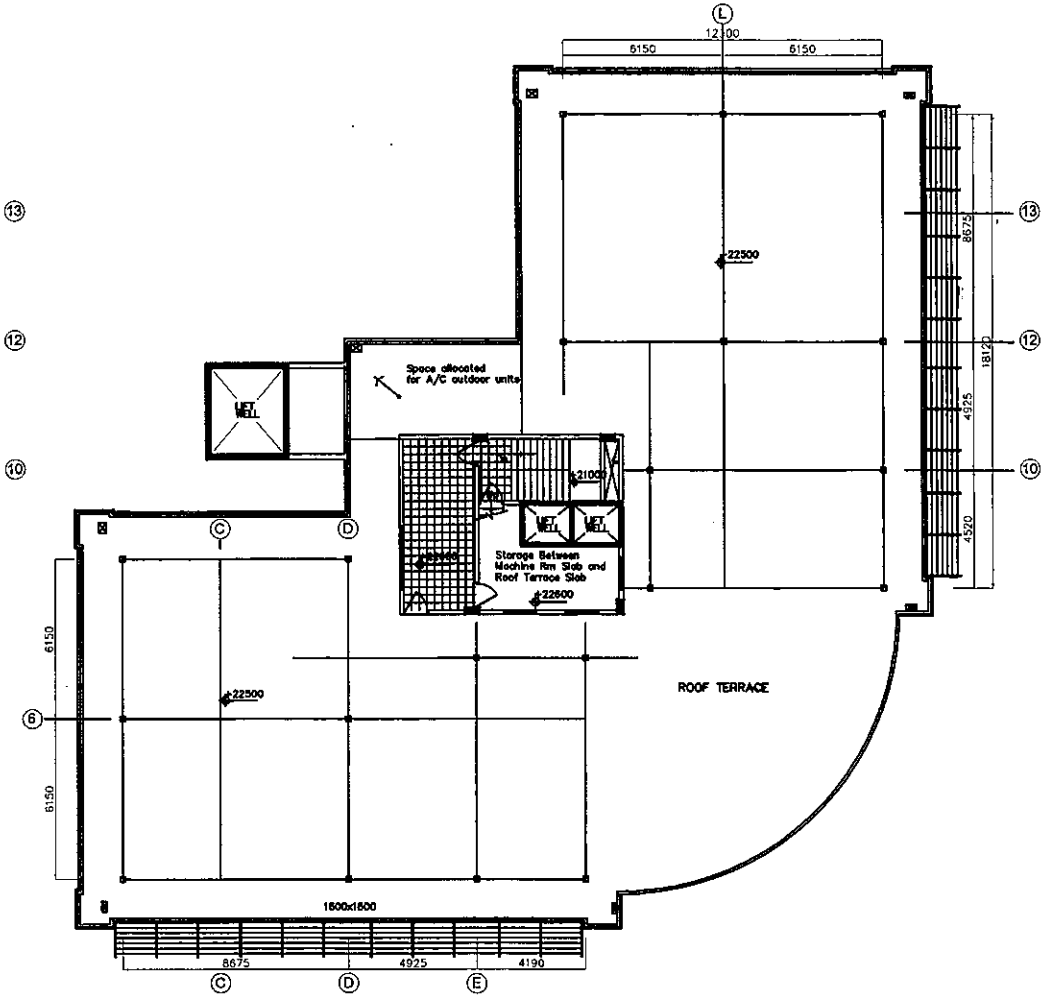
Area 41.8 × 0.7 = 29.3 kN

Foundation $0.95^2 \times \pi \times 0.5 \times 24 = 34.0$
Anchor 8
} 42.0



Chipping Area

TOTAL AXIAL FORCE

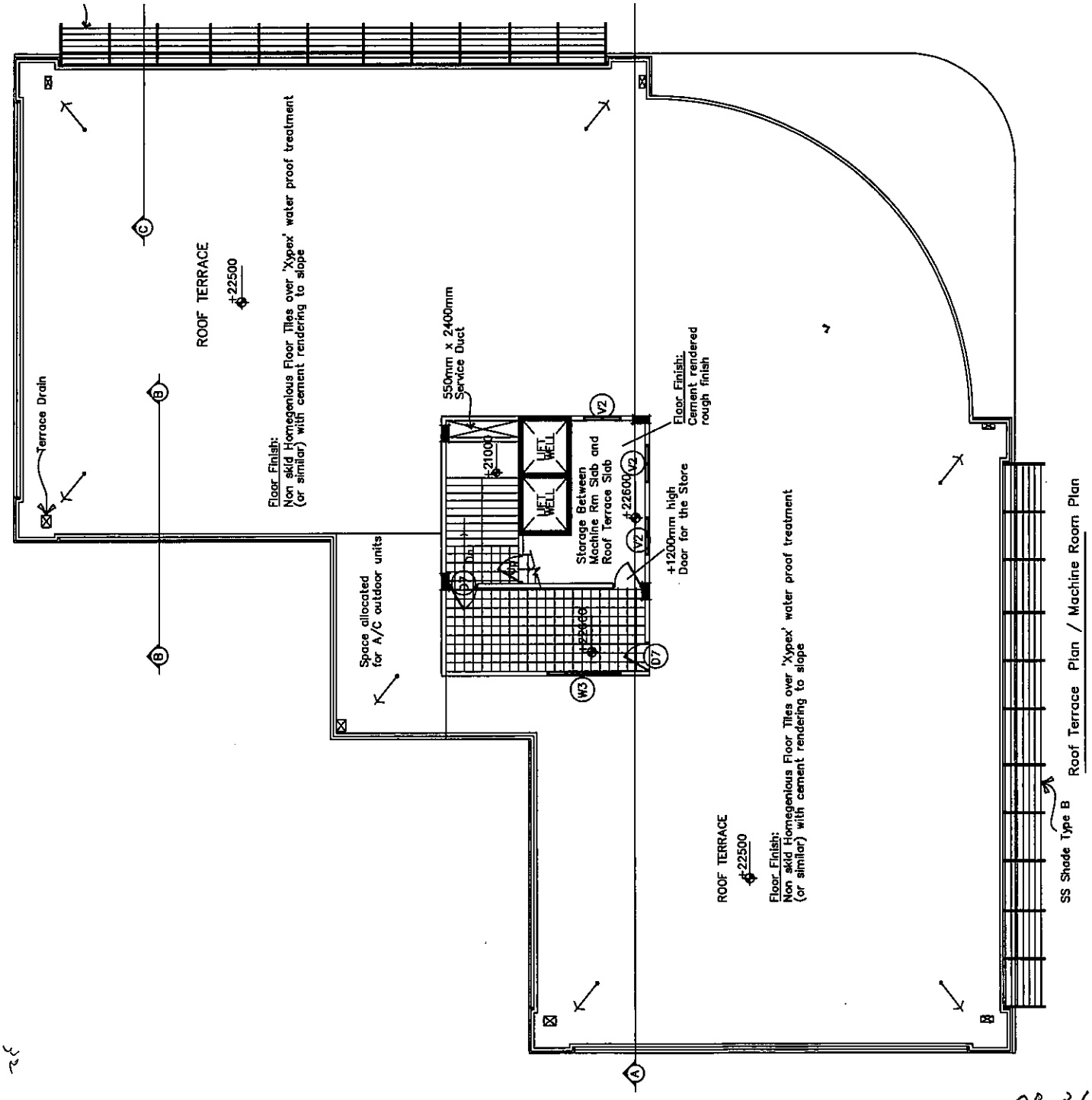


Repair Area

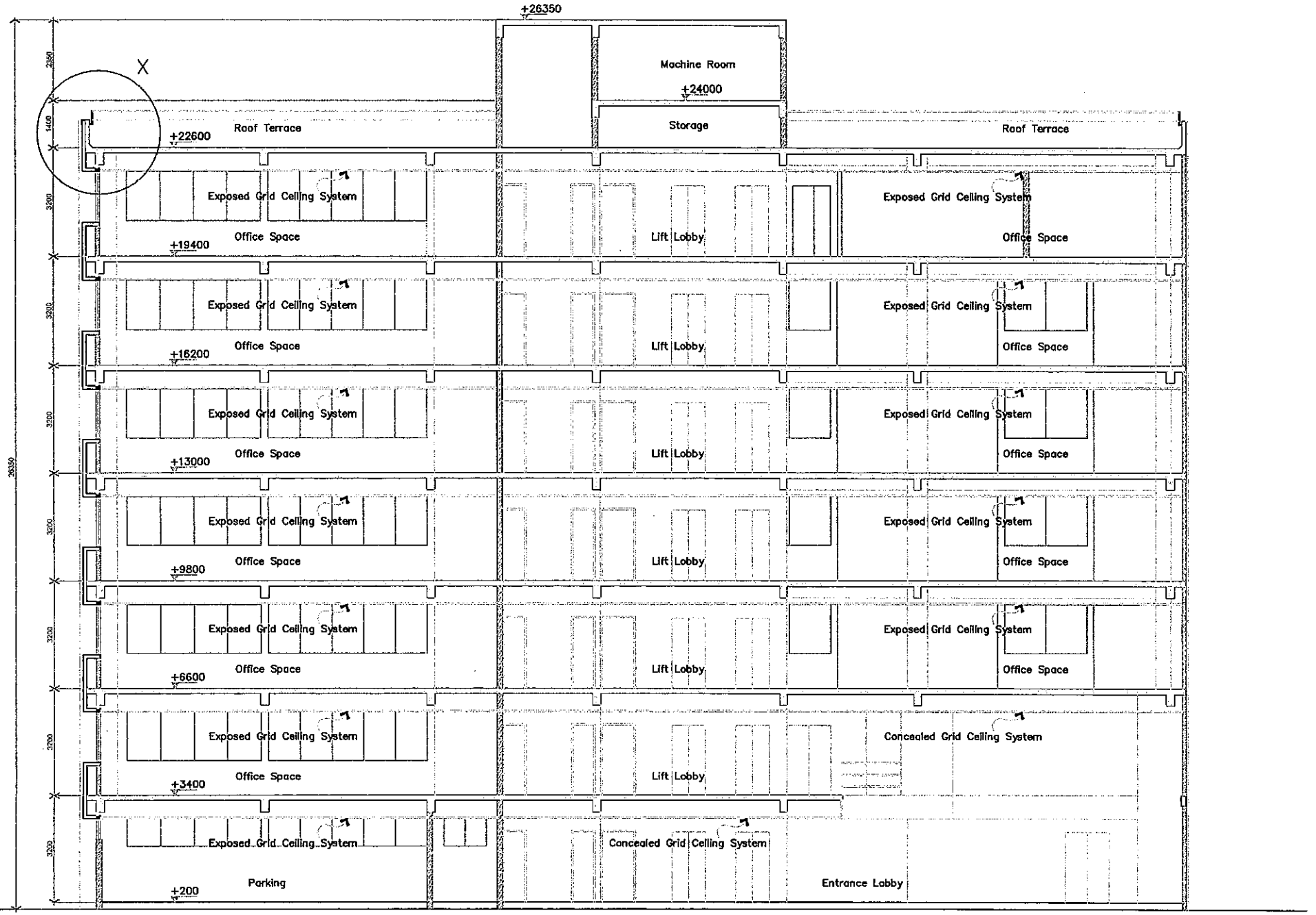
0 2 4 6 8 10m

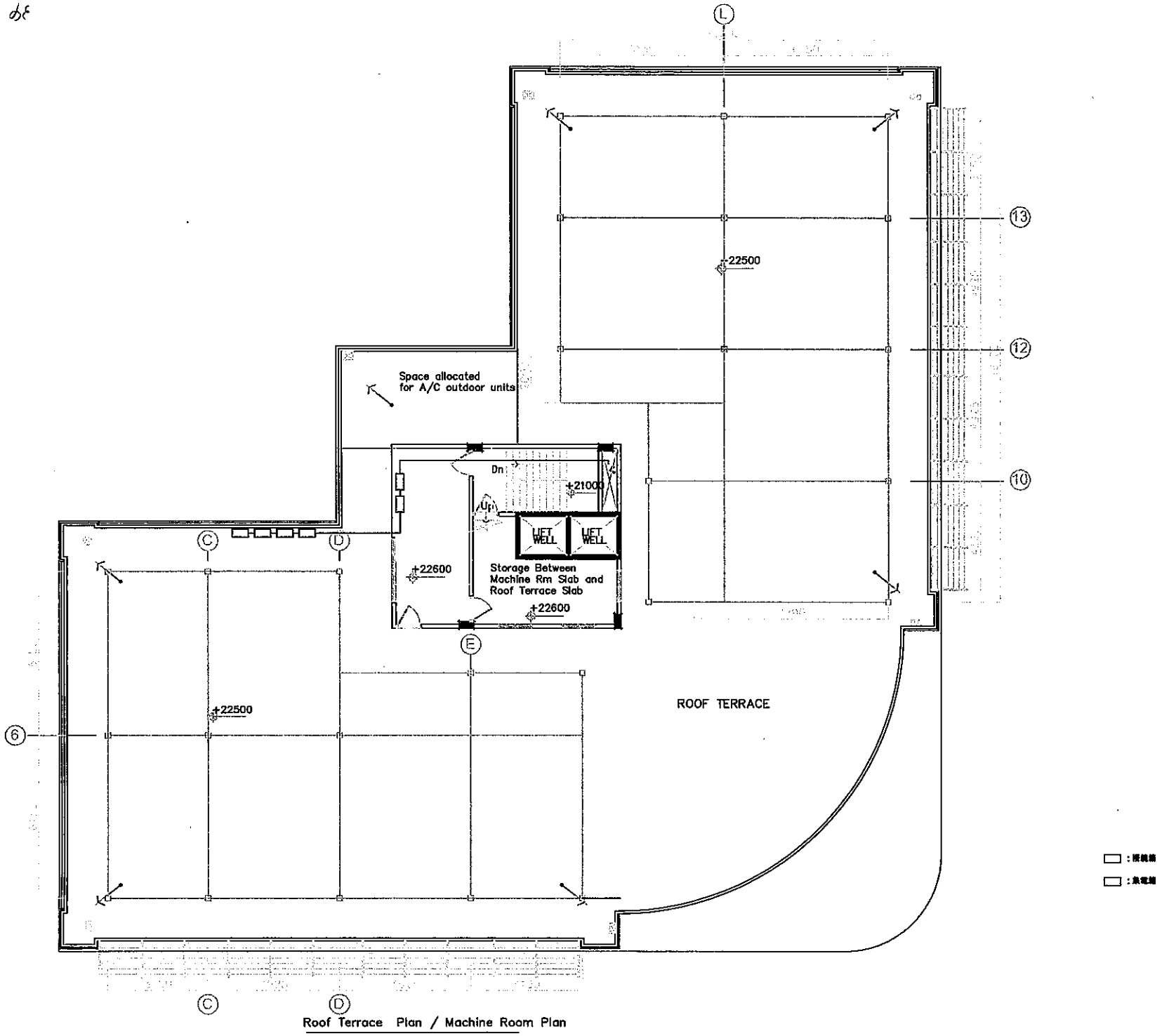
2. 既存建物安全性の確認

The confirmation of the existent building safety



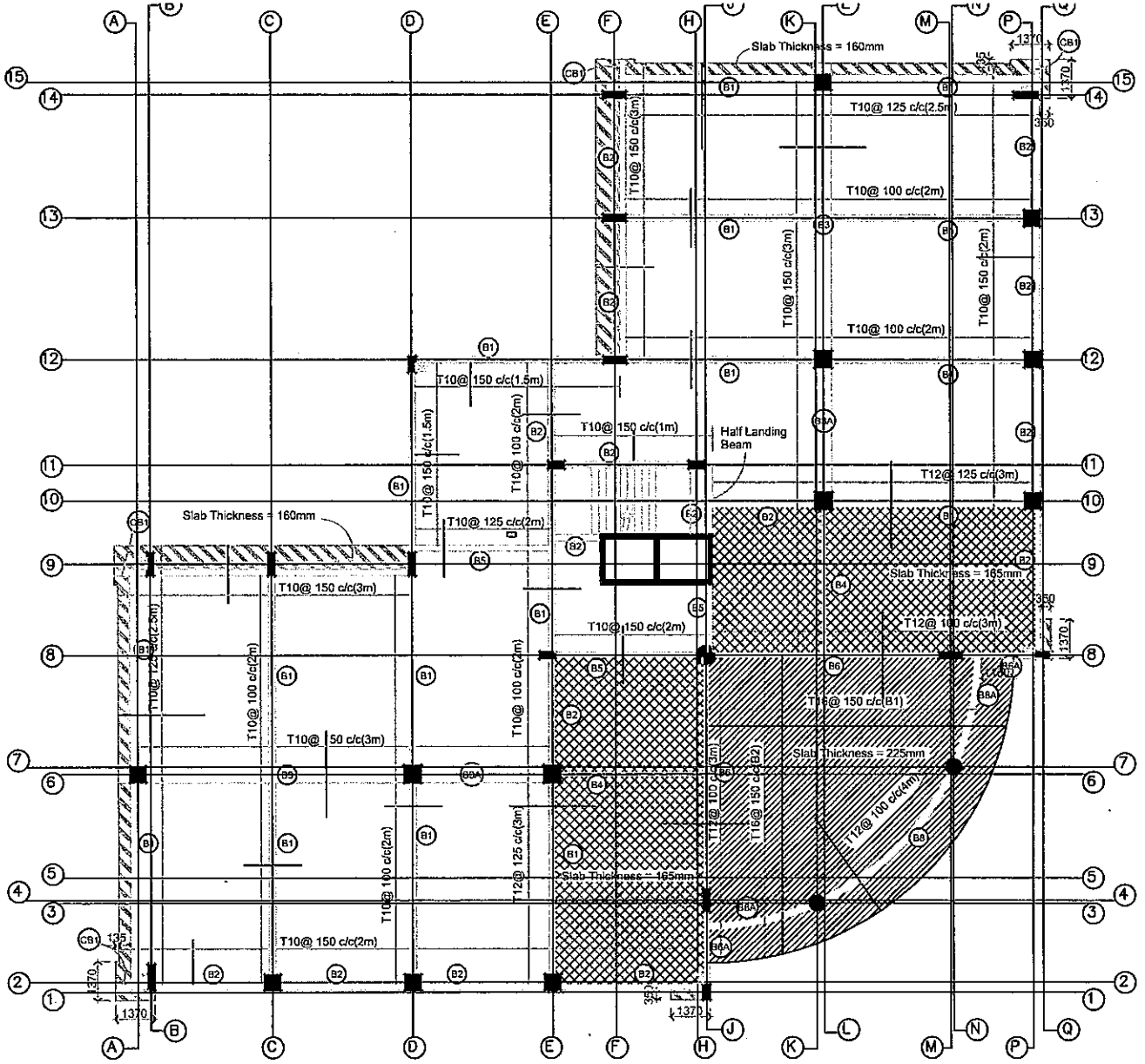
SB-31


+26350
Machine Room
+24000
Storage
Roof Terrace
+22600
Roof Terrace
Exposed Grid Ceiling System
Office Space
+19400
Lift Lobby
Exposed Grid Ceiling System
Office Space
Exposed Grid Ceiling System
Office Space
+16200
Lift Lobby
Exposed Grid Ceiling System
Office Space
Exposed Grid Ceiling System
Office Space
+13000
Lift Lobby
Exposed Grid Ceiling System
Office Space
Exposed Grid Ceiling System
Office Space
+9800
Lift Lobby
Exposed Grid Ceiling System
Office Space
Exposed Grid Ceiling System
Office Space
+6600
Lift Lobby
Exposed Grid Ceiling System
Office Space
Concealed Grid Ceiling System
+3400
Lift Lobby
Exposed Grid Ceiling System
Concealed Grid Ceiling System
Parking
+200
Entrance Lobby
X
2350
1400
3200
3200
3200
3200
3200
3200
3200
26350



Roof Terrace Plan / Machine Room Plan

□ :
□ :



ROOF TERRACE SLAB BEAM PLAN

Scale 1:200

Note : –

Slab Thickness = 150mm unless otherwise stated

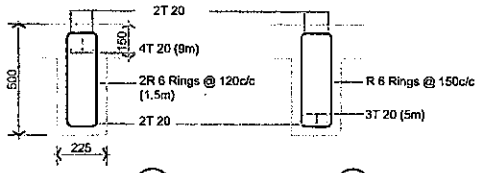
Top Reinforcement as shown

Bottom reinforcement

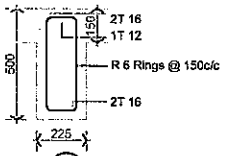
T10 @ 150 c/c b/w bottom (not shown)

SLAB BEAM DETAILS

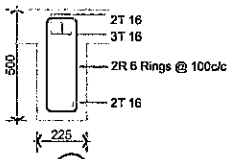
SCALE 1: 20



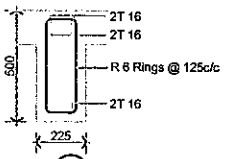
SUPPORT B1 SPAN B1



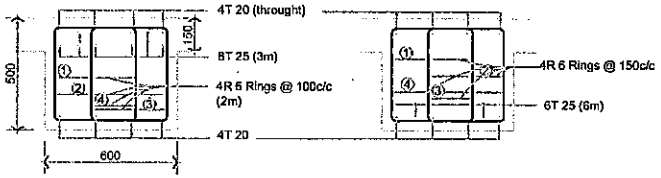
B2



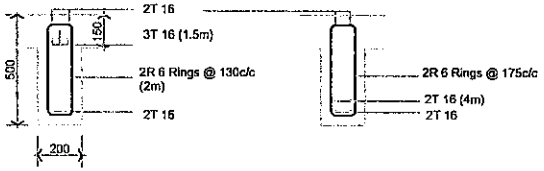
CB1



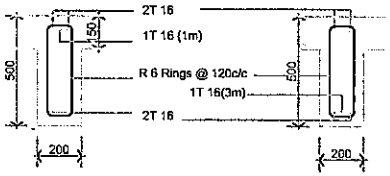
CB2



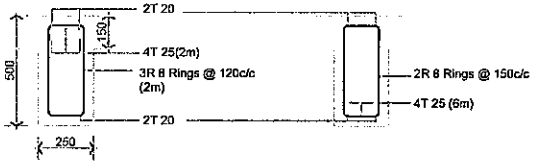
SUPPORT B3 SPAN B3



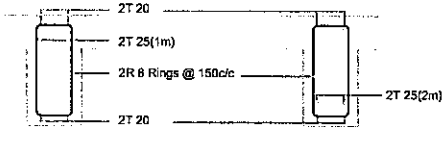
SUPPORT B4 SPAN B4



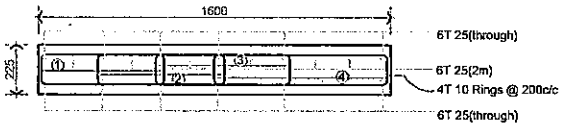
SUPPORT B5 SPAN B5



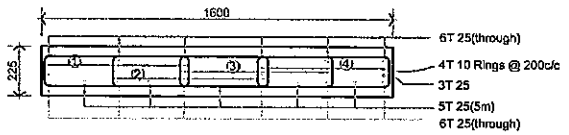
SUPPORT B6 SPAN B6



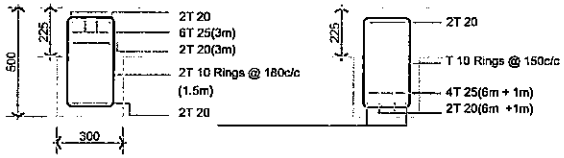
SUPPORT B6A SPAN B6A



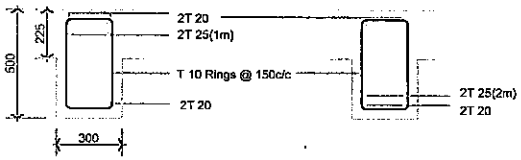
SUPPORT B7



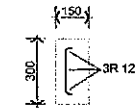
SPAN B7



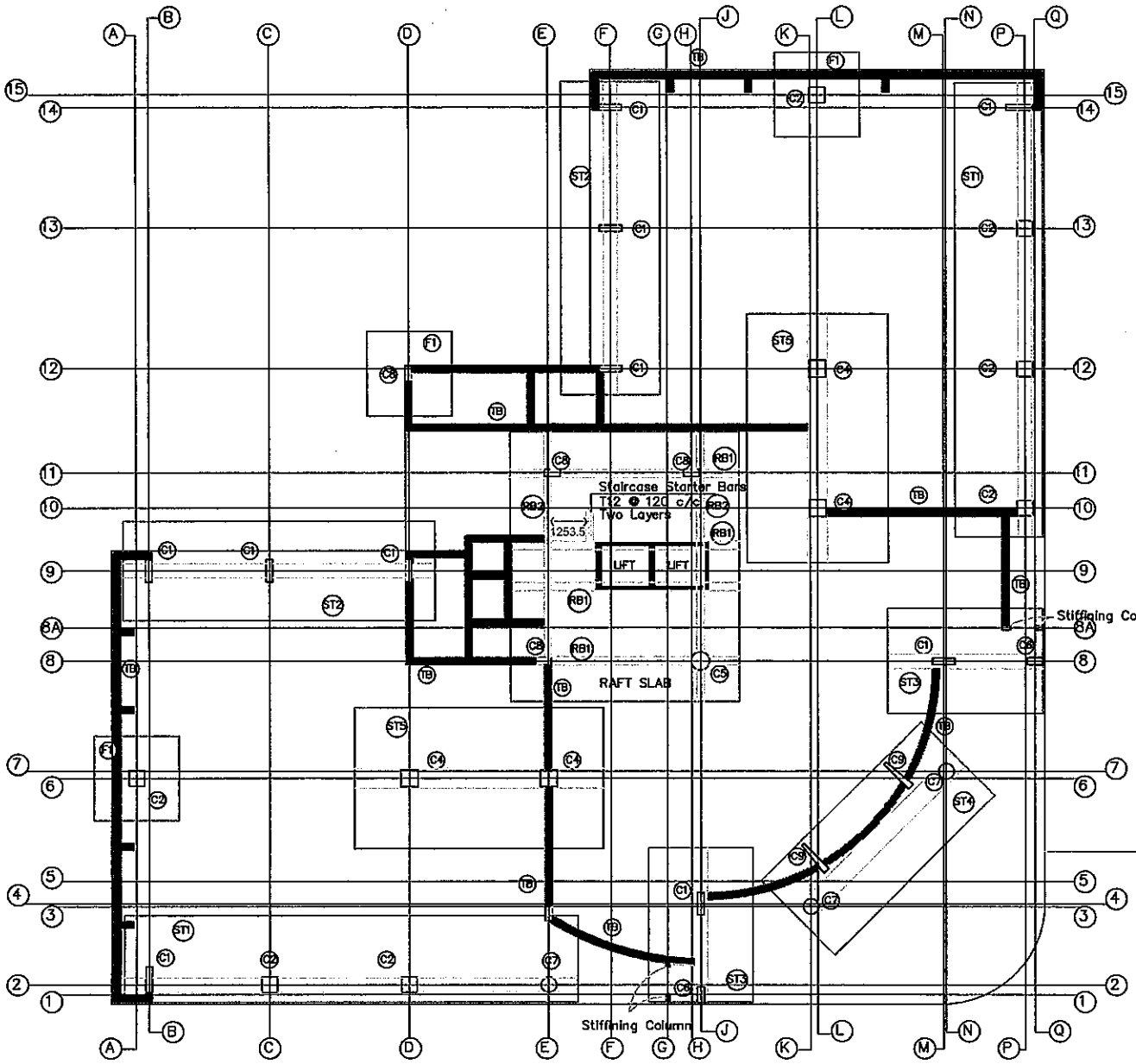
SUPPORT B8 SPAN B8



SUPPORT B8A SPAN B8A



STB Stiffning Beam



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

Boundary Line

FOUNDATION PLAN

Scale 1:200

SB-36

For. Roof STRUCTURE (Beam)
resistance shear force

$Q_A = b \cdot j \times \{ f_s + 0.5\, w f_t \times (p_w - 0.002) \}$

$\frac{0.71 \times 2}{25^n \times 15^n} = 0.0038.$

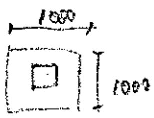
$\frac{28.3 \times 2}{225 \times 120} = 0.00209.$

0.71877

$Q_A = 225 \times 450 \times 7/8 \times (0.71 + 0.5 \times 195 \times (0.00209 - 0.002))$

$= 63.6$ kN.

for. Slab.

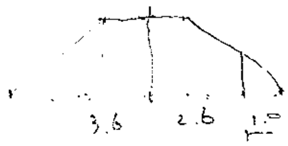


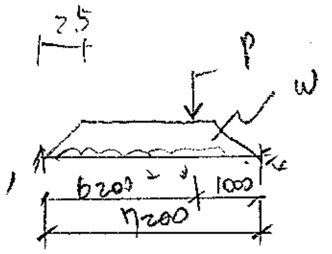
t = 120. / B = 4000

Ae = 120 × 4000 = 480,000 mm²

Q = 48 kN.   τ = 480 × 10³ / 480,000 = 0.1 N/mm² < 0.71

(Ref SB-30)





P = 48 kN

w = 6.7 × 4,925 = 33 kN/m

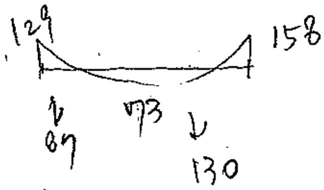
q = 0.225 × 0.35 × 24 = 1.89 kN/m

2.5 = 33
1.0 = 13.2

SLAB	150	360
Mortar	80	160
water proof		15
ceiling		20

555 + 130 (LL) = 685

→ 6.7 kN/m²



(B1)
22.5 × 50.

$a_t = \frac{158 \times 10^6}{215 \times 393.7} = 1867 < 6\text{-}D20\ (1884)$

$a_t = \frac{73 \times 10^6}{215 \times 393} = 864 < 5\text{-}D20\ (1570)$

OK

156 × 10⁶ / 128 ... 450

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

【基本事項・計算条件】

工　事　名：ﾓﾙﾃﾞｨﾌﾞ検討
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
・バネ材の使用　：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
・接合部ﾊﾟﾈ変形の考慮　：しない
・剛域・ﾊﾟﾈの軸変形の考慮　：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
・分布ﾊﾞﾈ　：無

・出力単位　：ＳＩ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	節点No. <1>	<2>	<3>	Ｘ方向ﾊﾞﾈ	Ｙ方向ﾊﾞﾈ	回転ﾊﾞﾈ
1	1	4		1.0	1.0	1.0

【材質】　[kN／mm2]

No	E	G
1	21.00	9.00

【断面性能】

No	A [cm2]	I [cm4]	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	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	曲げ	増減率 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	節点, 部材No. <1>	<2>	<3>	TYPE	方向	Ｐ１	Ｐ２	Ｐ３	Ｐ４	Ｐ５	Ｐ６
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】

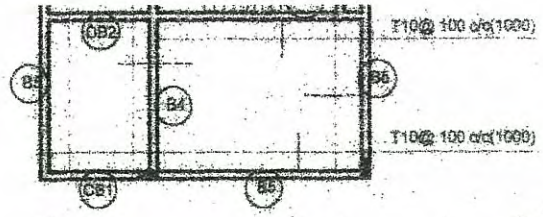
※※ 荷重ケース 1 ※※ DL+LL

節点No	δx [cm]	δy [cm]	θ [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

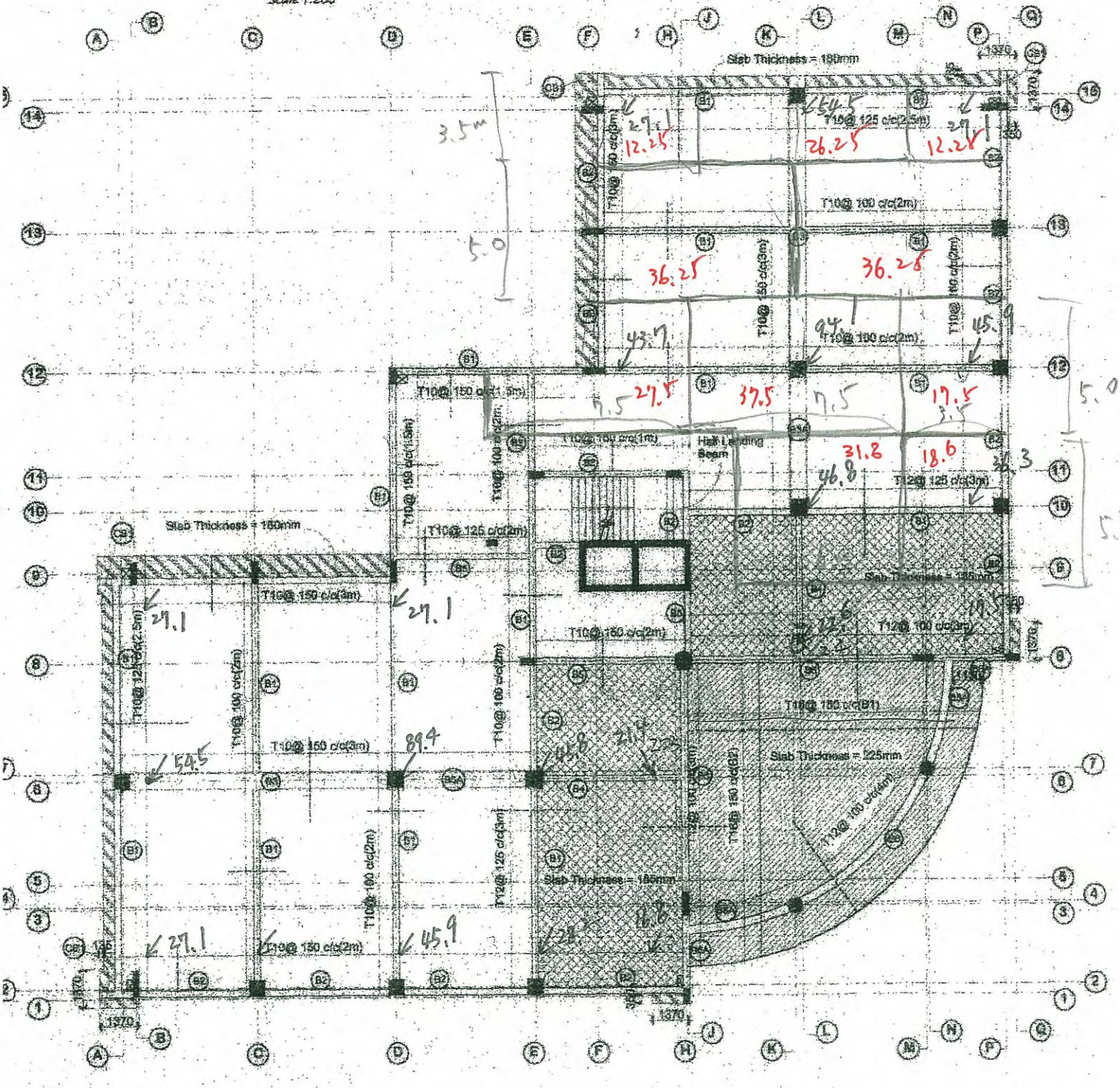
部材No	節点No i端	節点No j端	M [kNm] i端	M [kNm] 中央	M [kNm] j端	Q [kN] i端	Q [kN] j端	N [kN] i端	N [kN] j端
1	1	2	128.4	12.3	72.7	87.0	-2.6	0.0	0.0
2	2	3	-72.7	46.7	-31.0	2.6	73.3	0.0	0.0
3	3	4	31.0	-93.2	-157.6	-121.3	129.7	0.0	0.0



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 noted

Top Reinforcement as shown

Bottom reinforcement

T10@ 100 c/c in both directions

Average unit weight

$12.25\ m^2 \times 7.9\ kN/m^2 \times 8\ floor = 775\ kN$

$26.25 \times$ " $= 1659\ kN$

$36.25 \times$ " $= 2291\ kN$

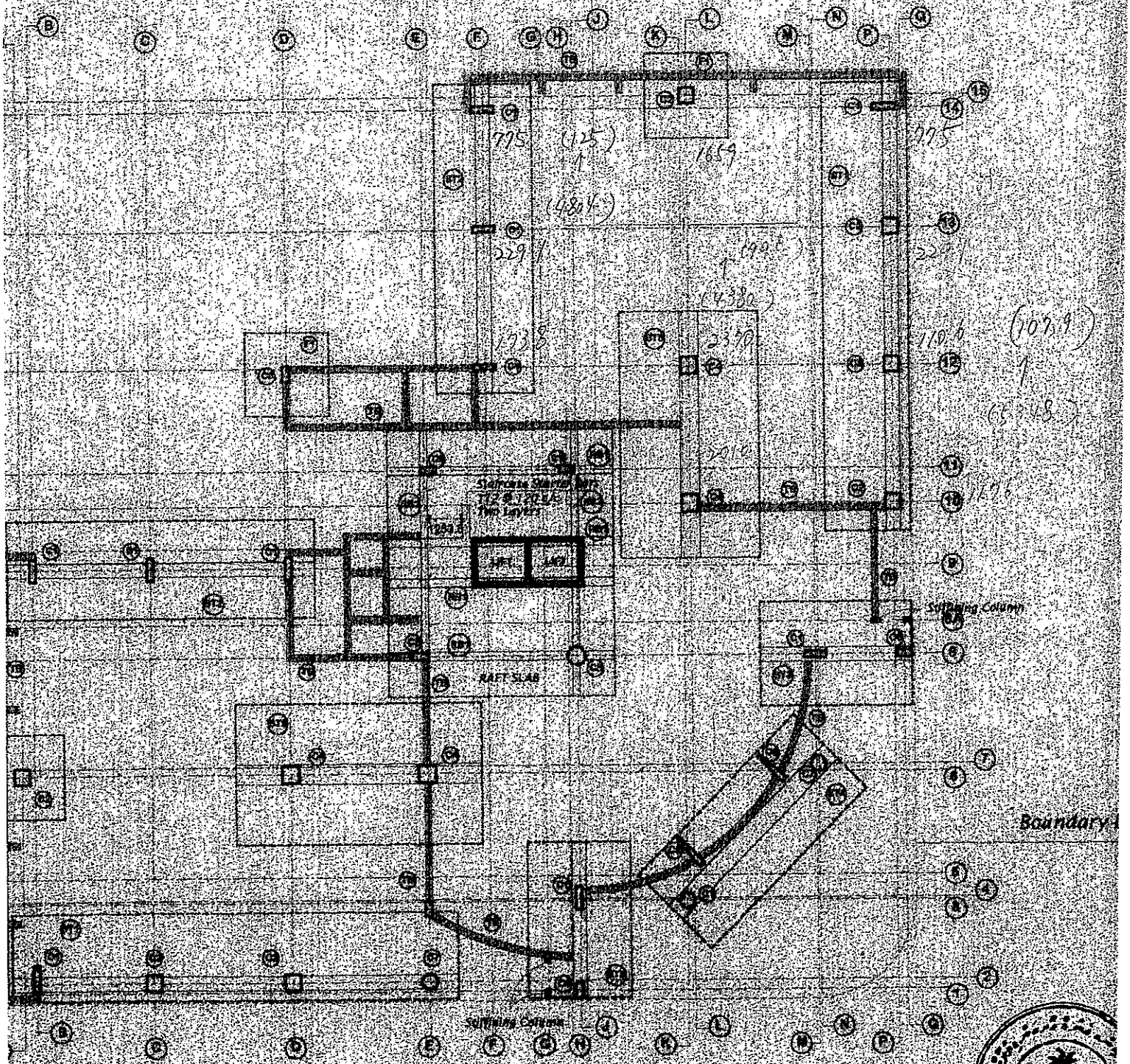
$27.5 \times$ " $= 1738\ kN$

$37.5 \times$ " $= 2370\ kN$

$17.5 \times$ " $= 1106$ "

$31.8 \times$ " $= 2010\ kN$

$18.6 \times$ " $= 1176\ kN$



FOUNDATION PLAN

Scale 1:200

REVISIONS		DESIGN	T.R.	JOB NO.	DN649	DWG. NO.
		STRUCT. DESIGN	L.S.	SCALE	1:200	
		DRAWN		FILE NO.	(R-COMMERCIAL)	ST-01

Ⓕ Line.

(4804 + 27.8 + 45.3) = 4878 kN

ST2 3.5 × 11.0

4878 / 38.5 = 126.7 kN/m²

(157) < 250 kN/m²

OK

⑯ Line.

(1659 + 56.1) = 1716 kN

F1 3.0 × 3.0

1716 / 9 = 190.7 kN/m²

(221) < 250 kN/m²

OK

Ⓛ Line.

(4380 + 96.8 + 48.0) = 4525

ST5 5.0 × 8.8

4525 / 44 = 102.9 kN/m²

(133) < 250

OK

Ⓟ Line

(5348 + 27.1 + 47.5 + 48) = 5470.6

ST1 3.1 × 16.0

5470.6 / 49.6 = 110.3 kN/m²

(141) < 250

20 × 1.5 = 30 kN/m²

OK

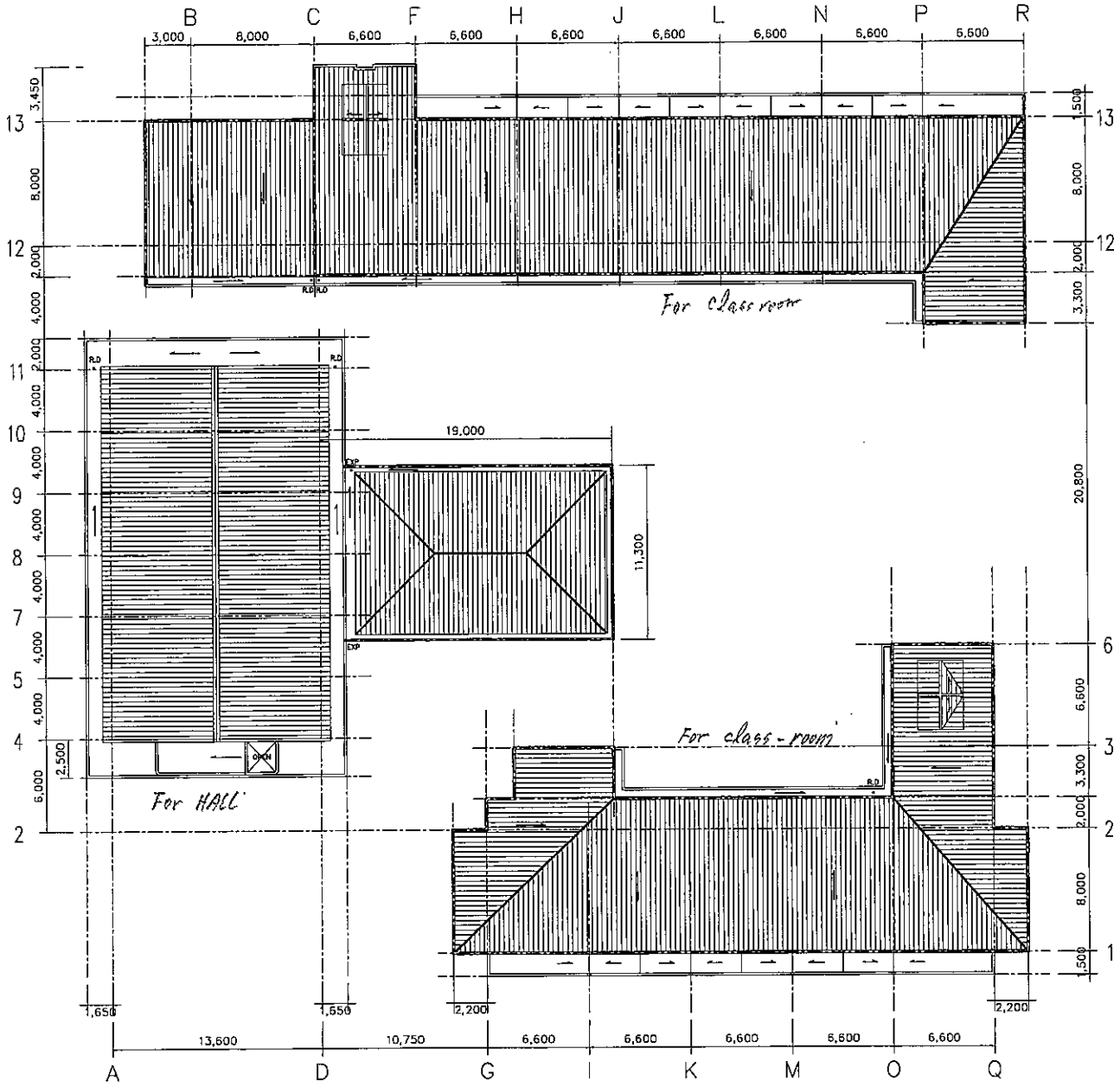
No.6 Kalaafaanu School

No.8 Thaajuddeen School

No.9 New Secondary School for Girls.

- PV panel and support frame : Weight is 0.5kN/㎡
- Support member is designed (for PV panel)
- Purlin, Post, Sub beam and Truss are confirmed with the existen member.
- There is no problem in the safety because additional weight is 0.5kN/㎡ with the main structure member.

No. 6 Kalaafaanu School



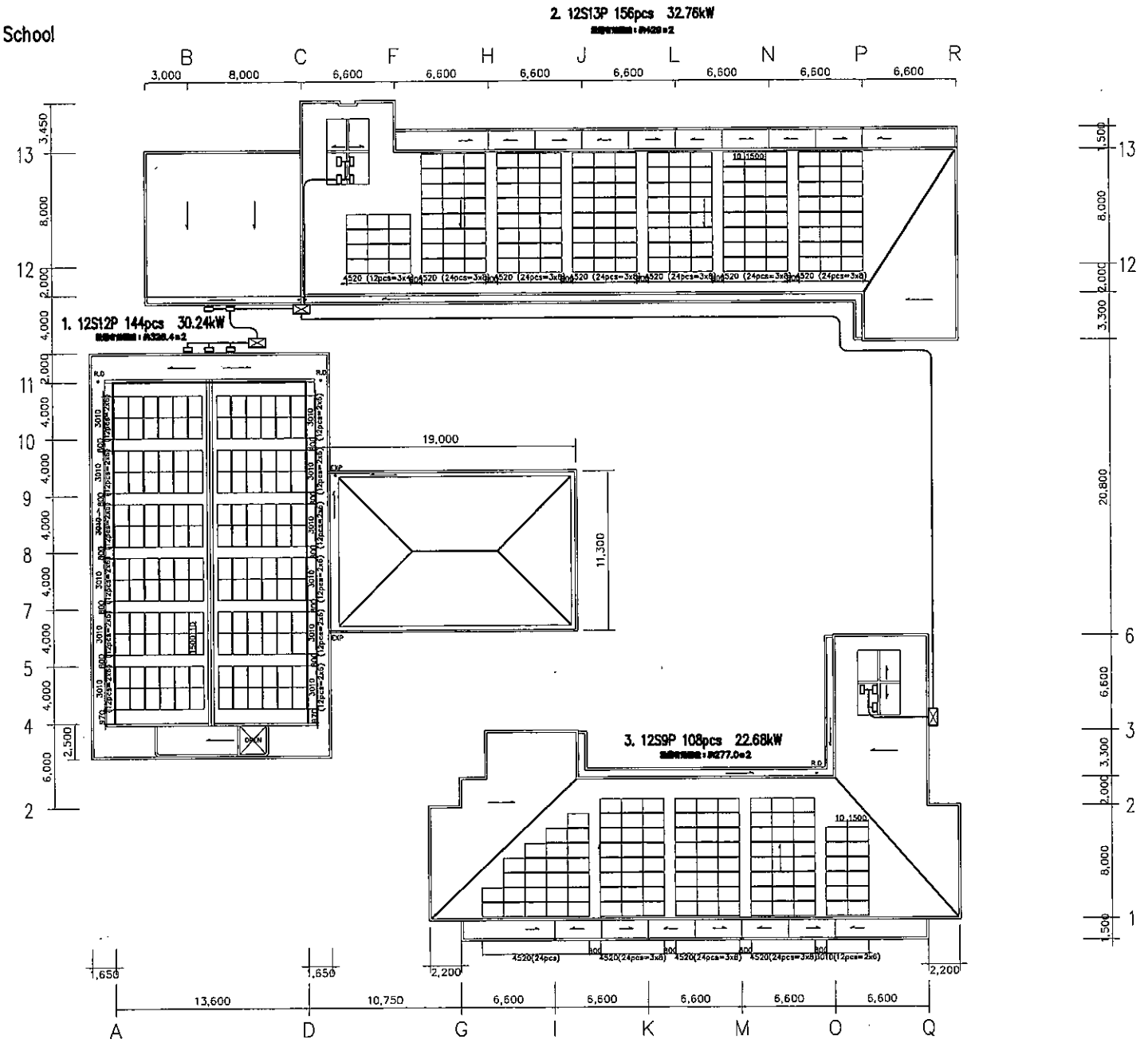
Roof plan

KTN-1

KTN-1

S=1:300

6 Kalaafaanu School



PV PANEL PLAN

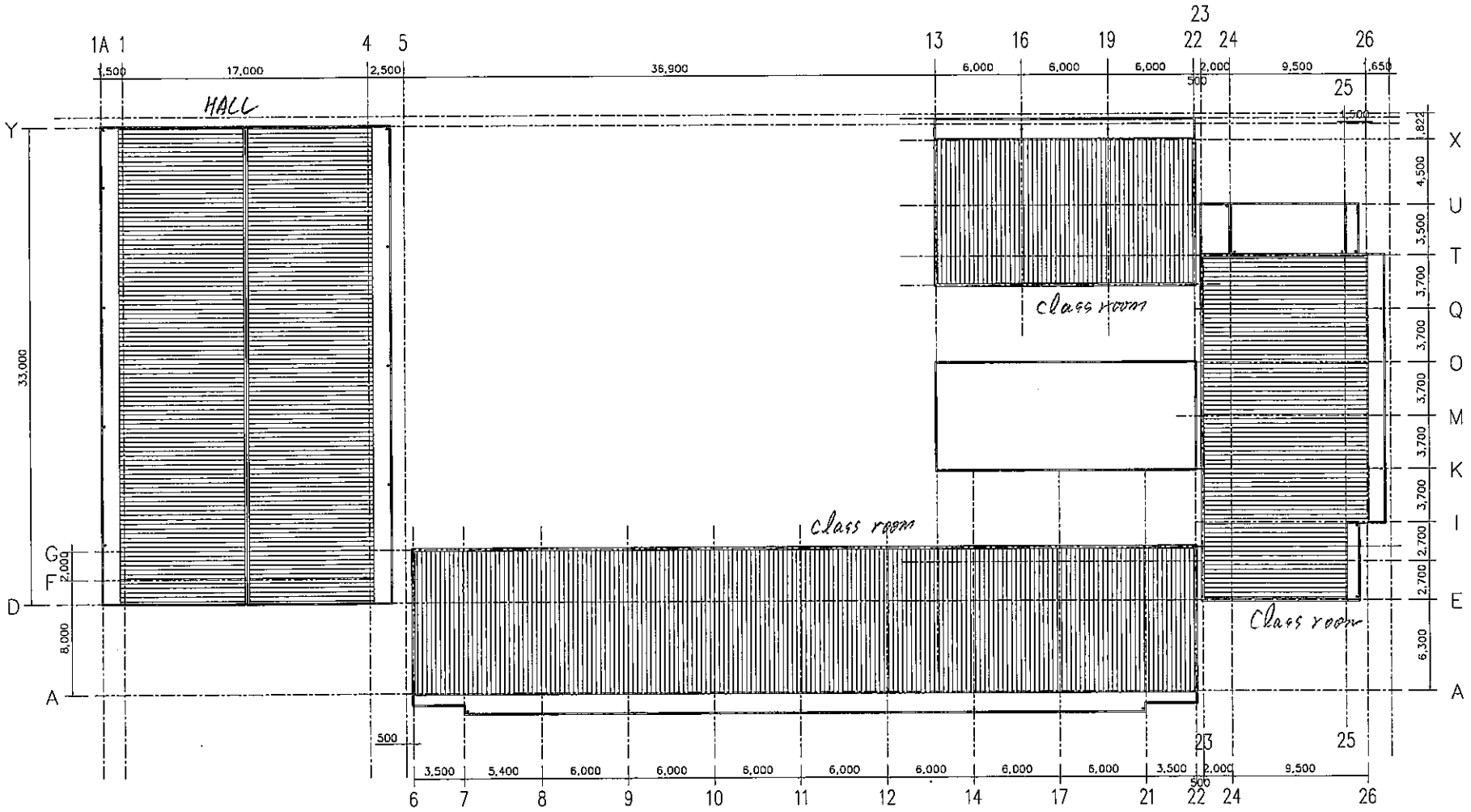
KTN-2

KTN-2

S=1:300

8A

No. 8 Thaajuddeen School



Roof PLAN

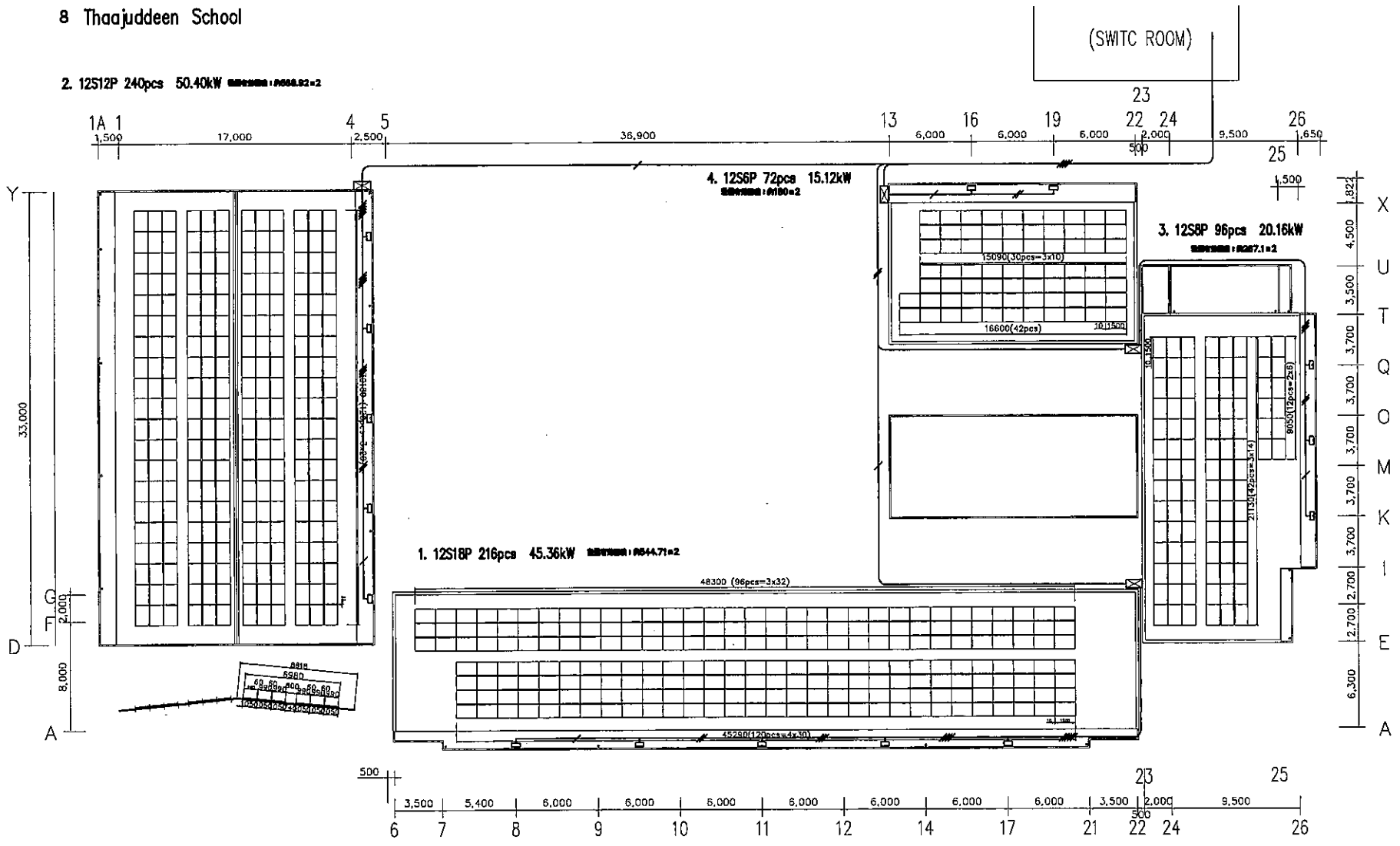
KTN-3

KTN-3

S=1: 300

64

8 Thaajuddeen School



PV PANEL PLAN

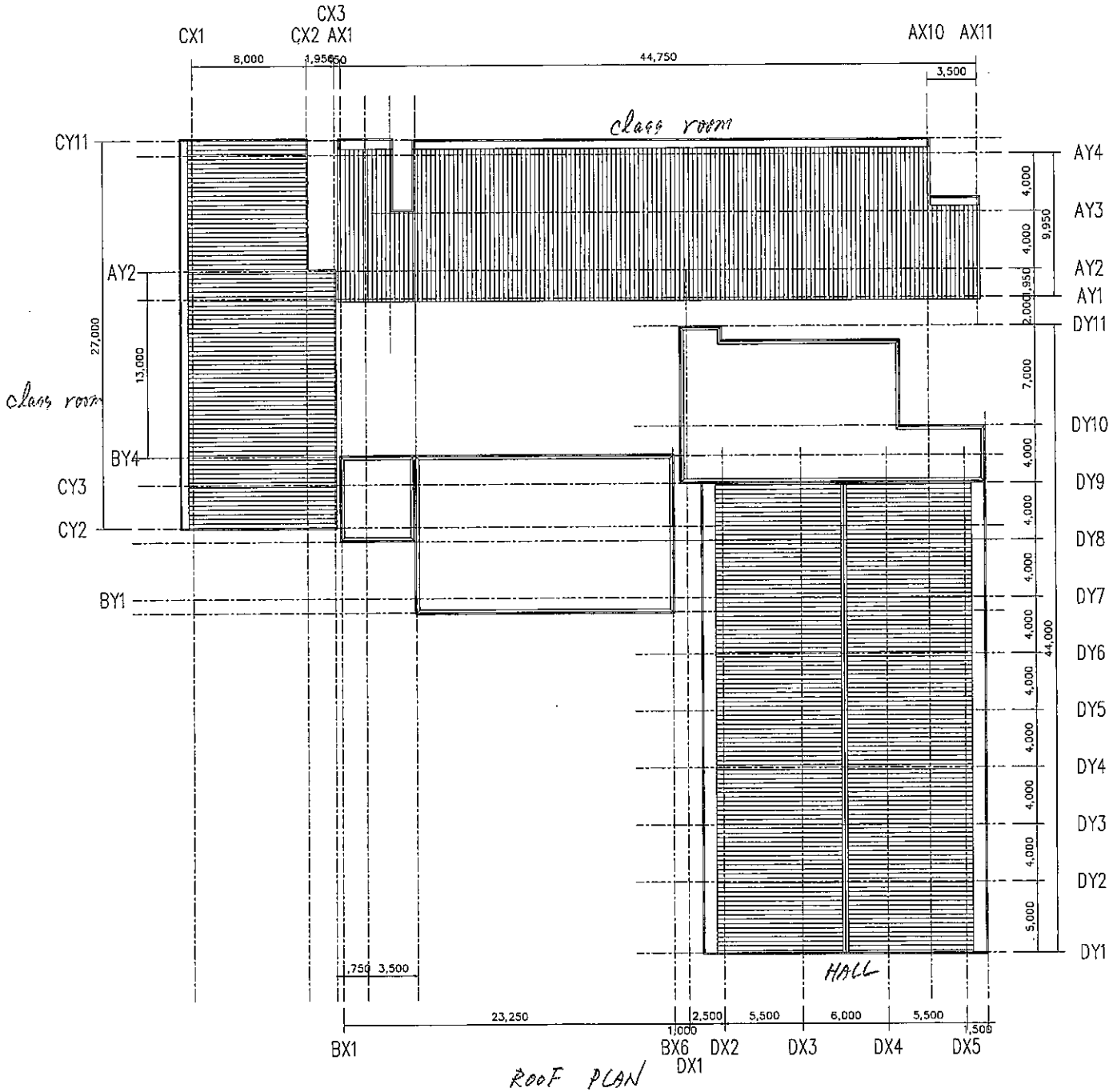
KTN-4

KTN-4

S=1:300

a)

No. 9. New Secondary School for Girls



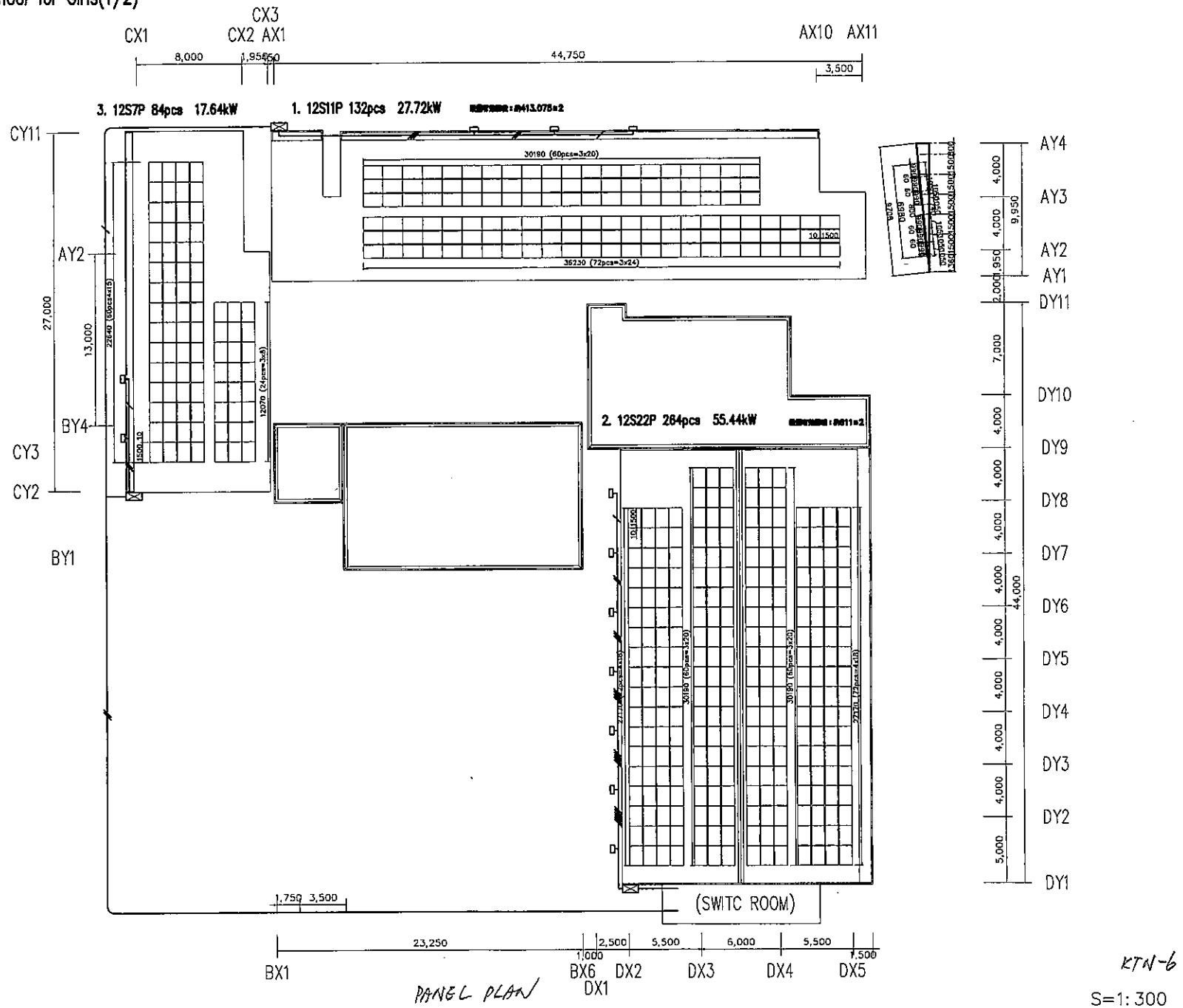
ROOF PLAN

KTN-5

KTN-5

S=1: 300

9 New Secondary School for Girls(1/2)



PANEL PLAN

KTN-6

S=1:300

KTN-6

Rough Weight of PV Panel

Site		Capacity of PV	UNIT	ITEM	Unit Weight	Unit	Piece or m	Weight		Area	unit load
No6	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	kg		
	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	kg		
	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	kg		
Total Capacity of PV		85.68	kW								

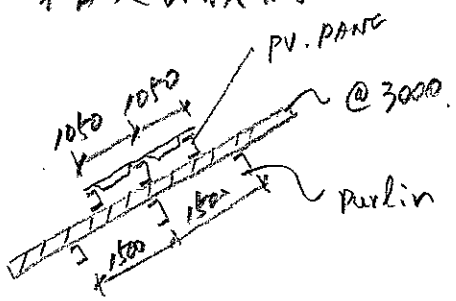
Site		Capacity of PV	UNIT	ITEM	Unit Weight	Unit	Piece or m	Weight		Area	unit load
No8	Class room-1	45.36	kW	PV Panel	30.5	kg/p	216	6588.0	kg	342.47	31.9
				Base Channel	10.3	kg/m	419.65	4322.4	kg		
				Sub Total				10910.4	kg		
	School Hall	50.4	kW	PV Panel	30.5	kg/p	240	7320.0	kg	380.52	32.3
				Base Channel	10.3	kg/m	483.04	4975.3	kg		
				Sub Total				12295.3	kg		
	Special class room	20.16	kW	PV Panel	30.5	kg/p	96	2928.0		152.21	32.5
				Base Channel	10.3	kg/m	196.19	2020.8			
				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	kg		
Total Capacity of PV		131.04	kW								

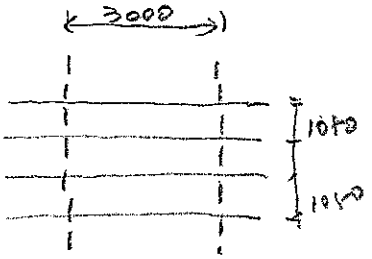
Site		Capacity of PV	UNIT	ITEM	Unit Weight	Unit	Piece or m	Weight		Area	unit load
No9	Class room-1	27.72	kW	PV Panel	30.5	kg/p	132	4026.0	kg	209.29	32.3
				Base Channel	10.3	kg/m	265.68	2736.5	kg		
				Sub Total				6762.5	kg		
	School Hall	55.44	kW	PV Panel	30.5	kg/p	264	8052.0	kg	418.57	31.9
				Base Channel	10.3	kg/m	513.22	5286.2	kg		
				Sub Total				13338.2	kg		
	Special class room	17.64	kW	PV Panel	30.5	kg/p	84	2562.0		133.18	30.8
				Base Channel	10.3	kg/m	149.41	1538.9			
				Sub Total				4100.9			
Total Capacity of PV		83.16	kW								

KTN-7

The examination of support frame

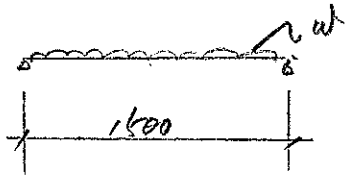
1. 架台受の検討.





Uload >

wl = 0.5 kN/m² (パネル+架材) × 3.0 m = 1.5 kN/m



M = 1/8 × 1.5 × 1.5² = 0.43 kNm

Q = 1/2 × 1.5 × 1.5 = 1.13 kN.

Class room Type. $\underline{\text{C-100×50×20×2.3}}$ $I_x = 80.7 \times 10^4$ $Z_x = 16.1 \times 10^3$

$f_b = 157$

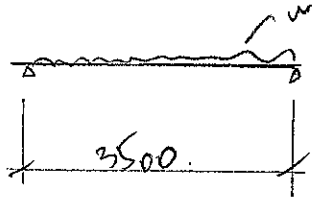
$\sigma_b = \frac{0.43 \times 10^6}{16.1 \times 10^3} = 27\ N/mm^2$ $\sigma_b / f_b = 0.18 < 1.0$

$\delta_{max} = \frac{5 \times 1.5 \times 1.5^4 \times 10^{12}}{3.84 \times 2.05 \times 10^5 \times 80.7 \times 10^4}$

$= 0.6\ mm = \ell/2500$

New

HALL TYPE.



M = 1/8 × 1.5 × 3.5² = 2.3 kNm

Q = 1/2 × 1.5 × 3.5 = 2.7 kN.

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

$\delta_{max} = \frac{5 \times 1.5 \times 3.5^4 \times 10}{3.84 \times 2.05 \times 80.7} = 17.8\ mm = \ell/196.$

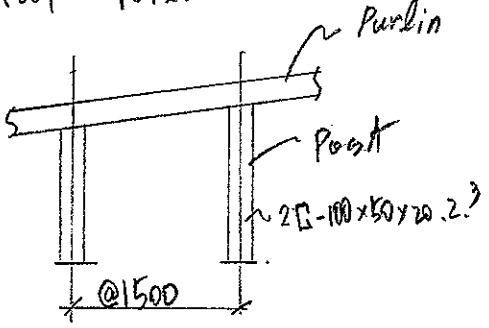
⇒ $\underline{\text{C-120×60×20×2.3}}$ $I_x = 140$ $Z_x = 23.3$

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

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

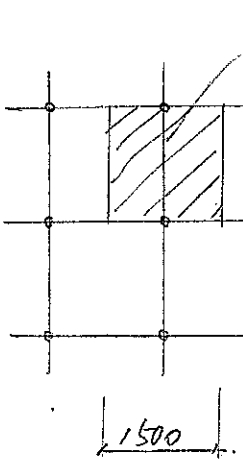
2. 既存部材の検討　The examination of the existent member
Roof for class room　No.6, No.8, No.9
(教室棟)

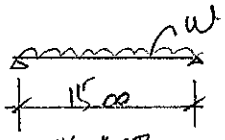
屋根、母屋検討
Roof Purlin



Dead Load

仕上げ	150 N/m²	(Finish)
母屋	200 N/m²	(Purlin)
パネル	500 N/m²	(PV)
	850 N/m²	





単純梁

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

Bending Moment $M = 1/8 \times 1.3 \times 1.5^2 = 0.4\ kN\cdot m$

Shear $Q = 1/2 \times 1.3 \times 1.5 = 1.0\ kN$

Purlin　2□-100×50×20×2.3　$f_b = 157\ N/mm^2$

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

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

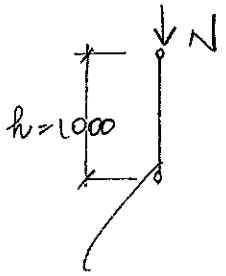
$\delta_{max} = \frac{5 \times 1.3 \times 1.5^4 \times 10}{3.84 \times 2.05 \times 80.7 \times 2} = 0.26\ mm = l/5770 < l/300$

OK

Ref. KTN-61, 79

(教室棟) For class room

東材の検討



Axial force

$N = 0.85\,kN/m^2 \times 1.5^m \times 1.5^m + 0.5\,kN/m \times 1.0^m$

$= 2.5\,kN$

2C-100×50×20×2.3

$A = 517 \times 2 = 1034\,mm^2$

$i_y = 19.2\,mm$

$l_k = 1000\,mm \quad \lambda = 1000/19.2 = 53$

$f_c = 133\,N/mm^2$

$\sigma_c = \frac{2.5 \times 10^3}{1034} = 2.5\,N/mm^2 \quad \sigma_c/f_c = 0.02 < 1.0$

OK.

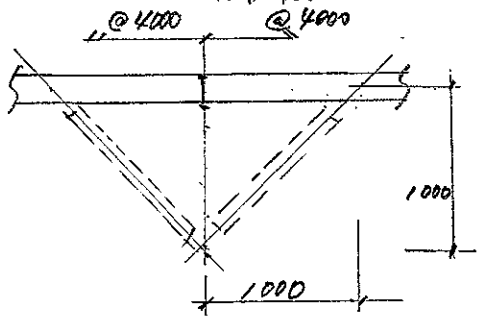
Ref. KTN-61, 79

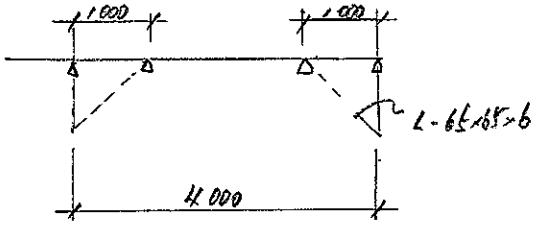
No.8.9

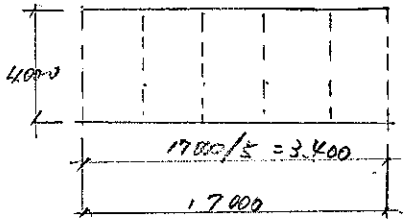
Hall
(体育館棟)

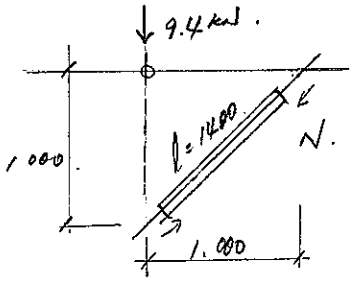
中間小梁の検討

Sub Beam









Sub Beam
小梁材

(TB43)

C-150×75×6.5×10

$I_x = 861\ cm^4$ $Z_x = 115\ cm^3$

$l = 4.0\ m$

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

$M = 1/8 \times 3.0 \times 4.0^2 = 6.0\ kN\cdot m$

$Q = 1/2 \times 3.0 \times 4.0 = 6.0\ kN$

$f_b = 157$

$\sigma_b = \frac{6.0 \times 10^6}{115} = 53\ N/mm^2$ $\sigma_b/f_b = 0.34 < 1.0$

$\delta_{max} = \frac{5 \times 3.0 \times 4.0^4 \times 10^9}{384 \times 2.05 \times 861} = 6\ mm = l/666$

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

L-65×65×6 $A = 7.527\ cm^2$ $i_y = 1.27\ cm$

$l_k = 1400\ mm$ $\lambda = 1400/12.7 = 111$

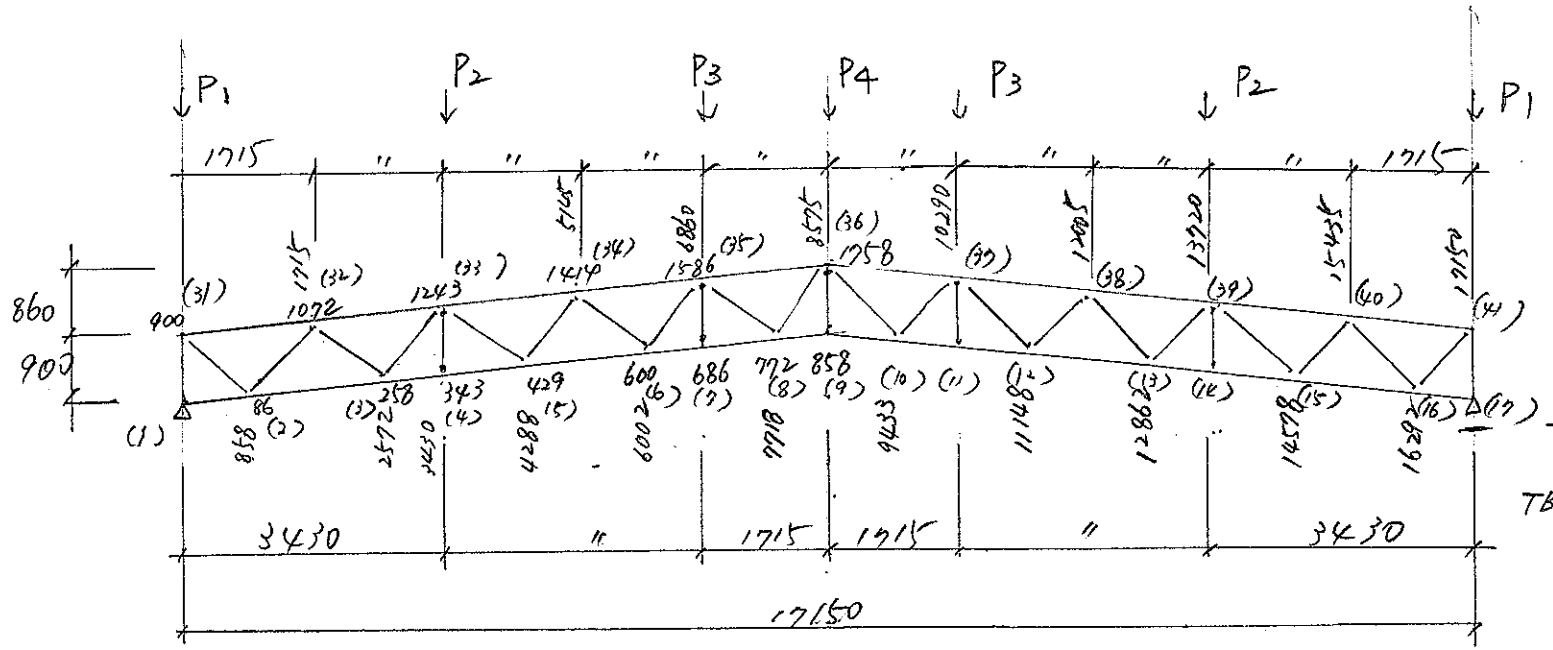
$f_c = 94$

$\sigma_c = \frac{8.5 \times 10}{7.527} = 12\ N/mm^2$ $\sigma_c/f_c = 0.17 < 1.0$

OK.

Ref. KTN-60, 62, 63
78, 86, 87

Main Truss for HALL (No.8, 9)



Ref, KTN-60, 62, 63
98, 86, 87

KTN-12

2L-90×90×7	12.22×2, 9.3×2	
L-65×65×6	7.52	29.4
2L-65×65×6	7.52×2	29.4×2
H-150×150×7	29.65	16.20

PV + finish: kN/m²
Truss: kN/m²

$P_1 = (0.85 + 0.2) \times 4.5^{m} \times 1.715^{m} = 8.1^{kN}$

$P_2 = \quad " \quad \times 3.43^{m} = 16.2$

$P_3 = \quad " \quad \times 2.58^{m} = 12.2$

$P_4 = \quad " \quad \times 1.715^{m} = 8.1$

Member Design.

(Upper chord.)

N = 190 kN (Compression)

2L-90×90×7 A = 12.22 cm² × 2 i_y = 1.77 × 2 = 3.54 cm

l_k = 1720 λ = 1720/34.5 = 50

f_c = 135

$\sigma_c = \frac{1900}{24.44} = 78$ N/mm² $\sigma_c/f_c = 0.58 < 1.0$ OK

N = 170.4 kN

l_k = 3430 λ = 3430/34.5 = 100

f_c = 86.4

$\sigma_c = \frac{1704}{24.44} = 70$ $\sigma_c/f_c = 0.81 < 1.0$

O.K.

(Web)

N = 47 kN (Compression)

L-65×6 A = 7.52 i_y = 1.27 l_k = 1260 λ = 100

f_c = 86.4

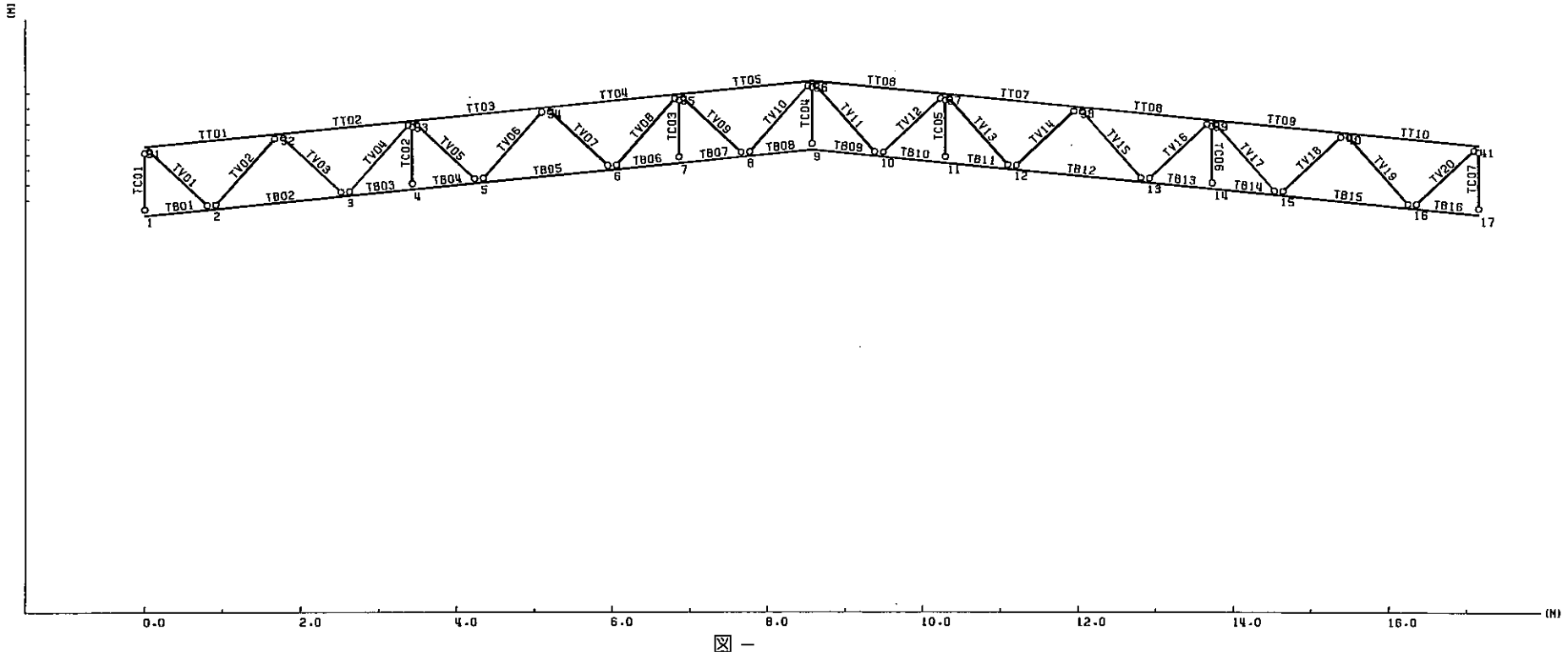
$\sigma_c = \frac{470}{7.52} = 62.5$ N/mm² $\sigma_c/f_c = 0.73 < 1.0$

MALDIVES NO.9 GIRLS SECONDARY

架　構　図

縮　尺　1:80

Frame



図－

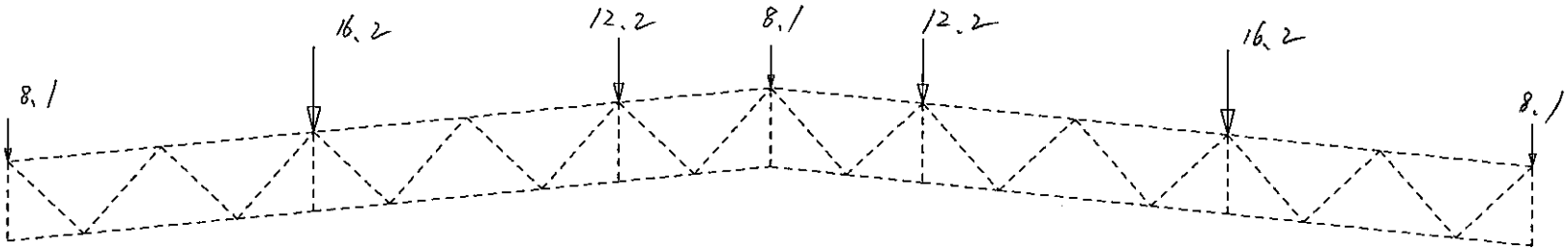
KTM-14

09

MALDIVES NO.9 GIRLS SECONDARY

荷　重　図

LOAD



KTN1-15

図－

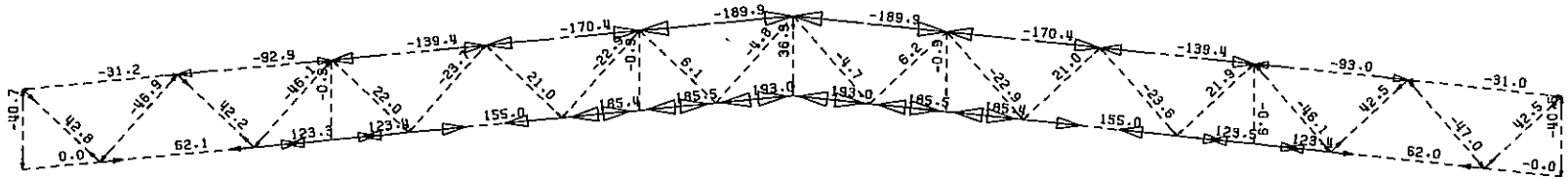
荷重名称　DL+LL
DEAD LOAD + LIVE LOAD

MALDIVES NO.9 GIRLS SECONDARY

軸　力　図

Axial force

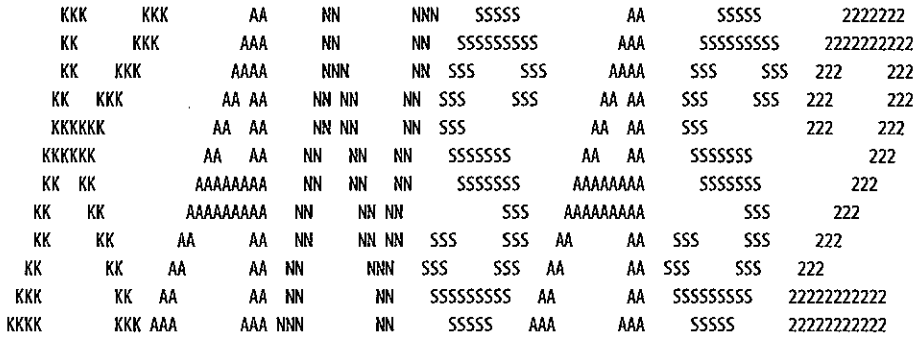
単位：　kN



図－

ケース名称　DL+LL
CHOUKI DURYOKU

KTN-16



INTEGRATED

STRUCTURAL ANALYSIS SYSTEM 2

KANSAS2 STATIC FOR WINDOWS VER. 2.2(2006.7)

DEVELOPED BY IT SOLUTIONS DEPARTMENT

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1 < KANSAS2 V2.2 >  TITLE( MALDIVES NO.9 GIRLS SECONDARY      )  STAFF( YEC              )  DATE( 2009/04/18 )    PAGE=    1

        *****  I N P U T   D A T A   E C H O   TOTAL (  109)  *****

                 10        20        30        40        50        60        70        80
            ....!....!....!....!....!....!....!....!....!....!....!....!....!....!....!

          1)  TITL MALDIVES NO.9 GIRLS SECONDARY      YEC                2009/04/18
          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)  *PR01:0::!
         37)  PR01     1    24.44                          186.
         38)  PR01     2     7.52                           29.4
         39)  PR01     3    15.04                           58.8
         40)  PR01     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           ....!....!....!....!....!....!....!....!....!....!....!....!....!....!....!
                 10        20        30        40        50        60        70        80

                                                                  2009/06/13  11:21:09  PAGE=    1
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KTN-18

***** I N P U T D A T A E C H O TOTAL (109) *****

```
                10        20        30        40        50        60        70        80
           ....!....!....!....!....!....!....!....!....!....!....!....!....!....!....!
           51) BEAM  TB10              1    1   10   11
           52) BEAM  TB11              1    1   11   12
           53) BEAM  TB12              1    1   12   13
           54) BEAM  TB13              1    1   13   14
           55) BEAM  TB14              1    1   14   15
           56) BEAM  TB15              1    1   15   16
           57) BEAM  TB16              1    1   16   17
           58) BEAM  TT01              1    1   31   32
           59) BEAM  TT02              1    1   32   33
           60) BEAM  TT03              1    1   33   34
           61) BEAM  TT04              1    1   34   35
           62) BEAM  TT05              1    1   35   36
           63) BEAM  TT06              1    1   36   37
           64) BEAM  TT07              1    1   37   38
           65) BEAM  TT08              1    1   38   39
           66) BEAM  TT09              1    1   39   40
           67) BEAM  TT10              1    1   40   41
           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
0          ....!....!....!....!....!....!....!....!....!....!....!....!....!....!....!
                10        20        30        40        50        60        70        80
```

***** I N P U T D A T A E C H O TOTAL (109) *****

```
                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  BOO1      SHITEN
106)  BOF1     1                          11
107)  BOF1    17                           1
108)  RUN  DL+LL    Y BOO1DL+LL         CHOUKI OURYOKU
109)  END
0         ....!....!....!....!....!....!....!....!....!....!....!....!....!....!....!
                10        20        30        40        50        60        70        80
```


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

MAX.	17.1500	1.7580	0.0000
MIN.	0.0000	0.0000	0.0000

KTN-2/

***** M E M B E R D A T A (B E A M) ***** (TOTAL 53)

MEMBER NAME	LENG (M) L	NODAL POINT I	NODAL POINT J	CONDITION I XYZ	CONDITION J XYZ	AREA (CM2) A	INERTIA-X (CM4) IX	INERTIA-Y (CM4) IY	INERTIA-Z (CM4) IZ	KAPPA KY	KAPPA KZ	E (N/MM2)	G (N/MM2)	ADJUSTING ANGLE (DEG.)	LENG (M) LD(Y)	LENG (M) 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

KTN-22

***** M E M B E R D A T A (B E A M) ***** (TOTAL 53)

MEMBER NAME	LENG (M) L	NODAL POINT I	NODAL POINT J	CONDITION I XYZ	CONDITION J XYZ	AREA (CM2) A	INERTIA-X (CM4) IX	INERTIA-Y (CM4) IY	INERTIA-Z (CM4) IZ	KAPPA KY	KAPPA KZ	E (N/MM2)	G (N/MM2)	ADJUSTING ANGLE (DEG.)	LENG (M) LD(Y)	LENG (M) 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
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

***** M E M B E R D A T A (B E A M) ***** (TOTAL 53)

MEMBER NAME	RIGID ZONE (M)				PHAI						ALPHA	DENSITY RHO	Y VECTOR OF MEMBER COOR.			VERTICAL MEMBER
	Y-I	Y-J	Z-I	Z-J	IX	IY	IZ	AXIAL	KY	KZ	(1/DEG)	(kN/M3)				
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	
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	

KTN-29

***** M E M B E R D A T A (B E A M) ***** (TOTAL 53)

MEMBER NAME	RIGID ZONE (M) Y-I	Y-J	Z-I	Z-J	PHAI IX	IY	IZ	AXIAL	KY	KZ	ALPHA (1/DEG)	DENSITY RHO (kN/M3)	Y VECTOR OF MEMBER COOR.			VERTICAL MEMBER
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

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

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

***** 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

***** B O U N D A R Y C O N D I T I O N D A T A *****

	NO.	BOUD. NAME	TITLE
0	1	BOO1	SHITEN

***** S I N G L E P O I N T C O N S T R A I N T *****

CASE(B001) LABEL(SHITEN)

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

KTN-29

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

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

54

KTN-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
TOTAL	0.00000	-81.10000	0.00000	0.0000000	0.0000000	0.0000000

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

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

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			

***** S T R E S S E S IN B E A M E L E M E N T S *****

CASE(DL+LL) LABEL(CHOUKI OURYOKU)

MEMBER NAME	BENDING MOMENT MZ-I (KN.M)	MZ-J (KN.M)	MY-I (KN.M)	MY-J (KN.M)	SHEAR QZ-I (KN)	QZ-J (KN)	QY-I (KN)	QY-J (KN)	AXIAL FORCE N-I (KN)	N-J (KN)	TWIST MOMENT (KN.M)
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

***** S T R E S S E S IN B E A M E L E M E N T S *****

CASE(DL+LL) LABEL(CHOUKI OURYOKU)

MEMBER NAME	BENDING MOMENT MZ-I (KN.M)	MZ-J (KN.M)	MY-I (KN.M)	MY-J (KN.M)	SHEAR QZ-I (KN)	QZ-J (KN)	QY-I (KN)	QY-J (KN)	AXIAL FORCE N-I (KN)	N-J (KN)	TWIST MOMENT (KN.M)
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	0.782	0.782	0.000	0.000	0.000	0.000	0.827	0.827	192.98	192.98	0.000
(MEMBER)	(TB09)	(TB08)	(TB01)	(TB01)	(TB01)	(TB01)	(TB08)	(TB08)	(TB08)	(TB08)	(TB01)
MIN. VALUE	-0.138	-0.138	0.000	0.000	0.000	0.000	-0.825	-0.825	-189.93	-189.93	0.000
(MEMBER)	(TB02)	(TB01)	(TB01)	(TB01)	(TB01)	(TB01)	(TB09)	(TB09)	(TT06)	(TT06)	(TB01)

KTN-35

***** S U M M A R Y O F A N A L Y S I S *****

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 CASE(1)	BODY FORCE			(0)	<<TOTAL>>	(7)
	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 CONDITION	BOUNDARY FIX OR SPRING	(Y)					
	DISTRIBUTED SPRING	(N)					
SPECIAL FUNCTION	ZERO STIFFNESS	(N)	REMAIN STRAIGHT	(N)			
	REMAIN PLANE	(N)	MULTIPOINT CONSTRAINTS	(N)			
	SAME DISPLACEMENT	(N)					
RUN CASE		NUMBER OF					
	(1)	CARDS	(101)				
STRESS COMB.		ANALYSIS					
	(0)	METHOD	DIRECT SPARSE SOLVER				
PLOT DATA	(-)	CPU TIME	0.031 SEC				

BY PC-WINDOWS KANSAS2

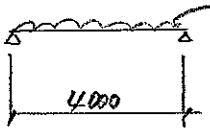
18

KTN-36

No.6 (Hall)

No.6. 体育館

屋根受け (Beam)



$w = 0.85\ kN/m^2 \times 3.4\ m = 2.9\ kN/m$

$M = 1/8 \times 2.9 \times 4.0^2 = 5.8\ kN\cdot m$

$Q = 1/2 \times 2.9 \times 4.0 = 5.8\ kN$

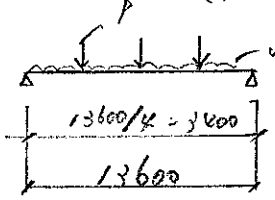
H-194×150×6×9 $\quad I_x = 2630\ cm^4 \quad Z_x = 271\ cm^3$

$f_b = 157$

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

$\delta_{max} = \frac{5 \times 2.9 \times 4.0^4 \times 10^4}{3.84 \times 2.05 \times 2630} = 1.8\ mm = l/2222$ OK

No.6
Main Beam (Hall)



$P = 5.8 \times 2 = 11.6\ kN \quad w = 0.85\ kN/m^2 \times 0.5\ m + 1.5\ kN/m = 2.0\ kN/m$

$M = 1/2 \times 11.6\ kN \times 13.6\ m + 1/8 \times 2.0 \times 13.6^2 = 78.9 + 46.3 = 125.2\ kN\cdot m$

$Q = 3/2 \times 11.6\ kN + 1/2 \times 2.0 \times 13.6 = 17.4 + 13.6 = 31.0\ kN$

H-600×200×11×17 $\quad I_x = 75600\ cm^4 \quad Z_x = 2520\ cm^3 \quad l_b = 3400$

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

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

$\delta_{max} = \frac{5 \times 2.0 \times 13.6^4 \times 10^4}{3.84 \times 2.05 \times 75600} + \frac{19 \times 11.6 \times 10^2 \times 13.6^3 \times 10^6}{3.84 \times 2.05 \times 75600}$

$= 5.75 + 9.4 = 15.15\ mm = l/897$ OK

28

Ref. KTN-47, 48

Foundation.

For class room

All buildings are designed in the mat foundation

4th Bulb

$8.0 \times 5 = 40\ kN/m^2$ about $40 \sim 45\ kN/m^2 < 100\ kN/m^2$

O.K

For Hall

roof. $(0.5 + 0.5 + 1.0)\ kN/m^2 \times 40 \times 9.0 = 666$

floor $10.0\ kN/m^2 \times 3.0^m \times 40^m \times 2 = 240$

Foundation 40×3.25^m $\sigma_e = \frac{306}{13}$

$= 23.6\ kN/m^2 < 100\ kN/m^2$

O/C

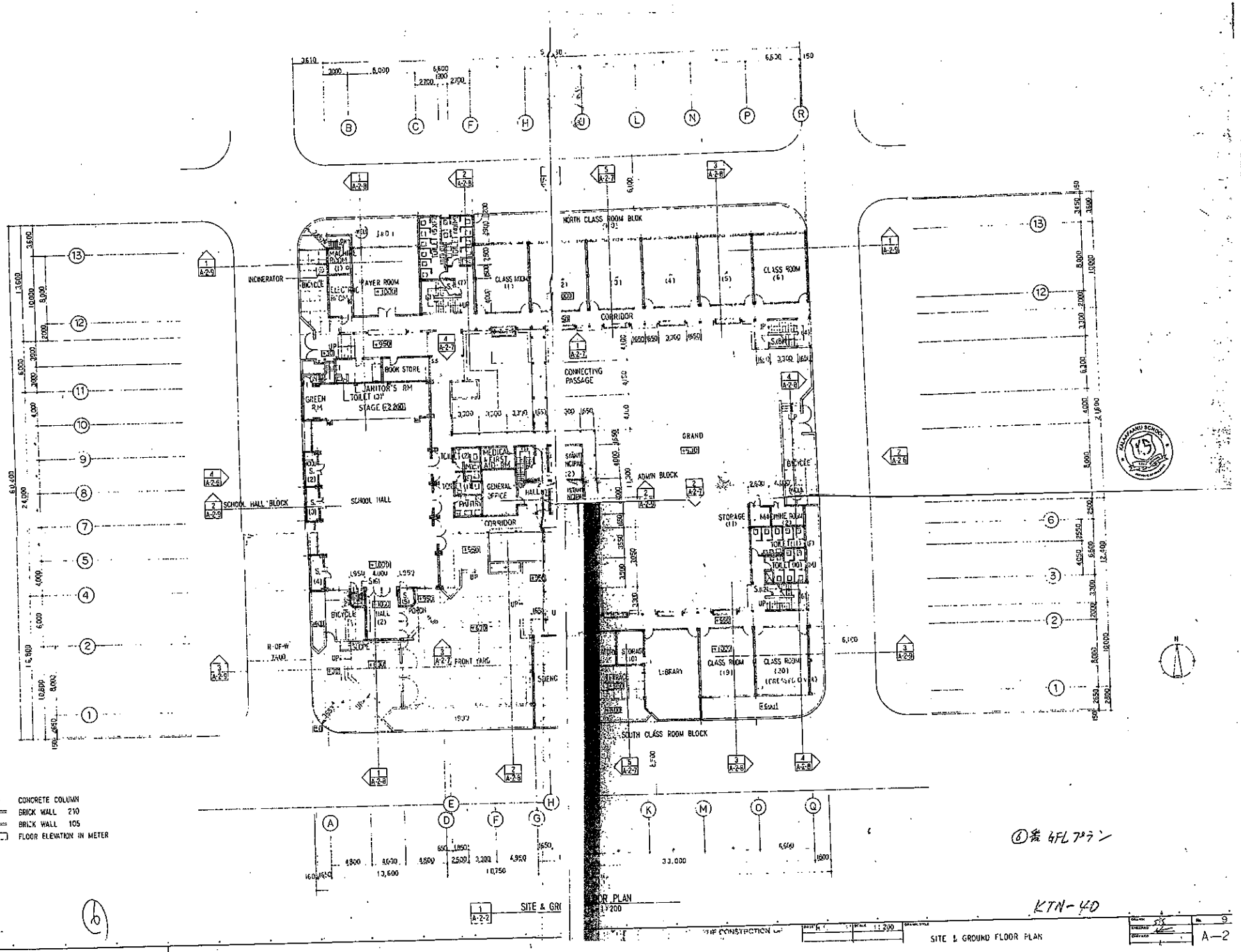
Ref. KTN -76
-59

3. As-Build DWG

No. 6.

Kalaafaanu School

As-Build DWG

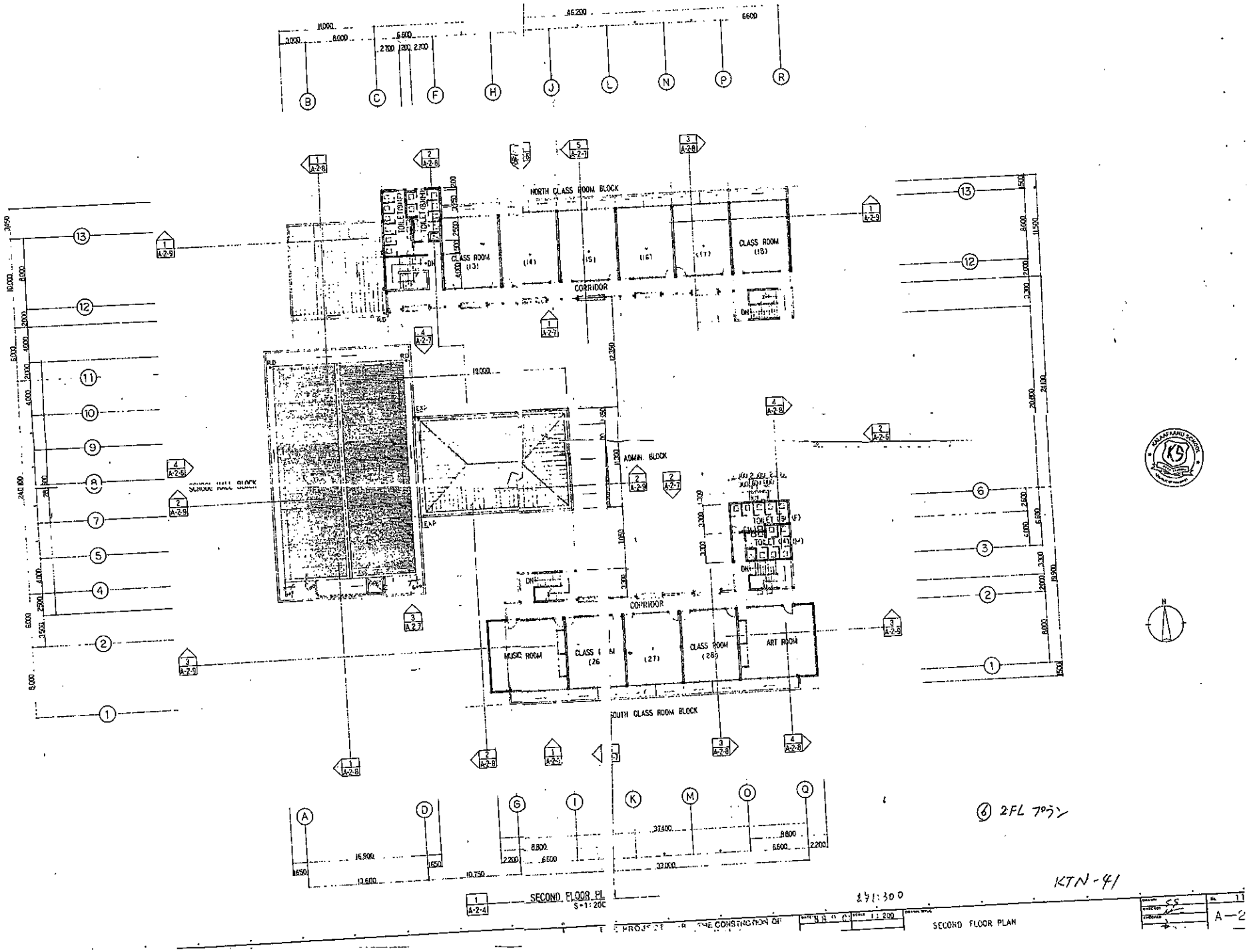


⑥番 GFL プラン

KTN-40

KTN-40

98



KTN-41

⑥ 2FL プラン

KTN-41

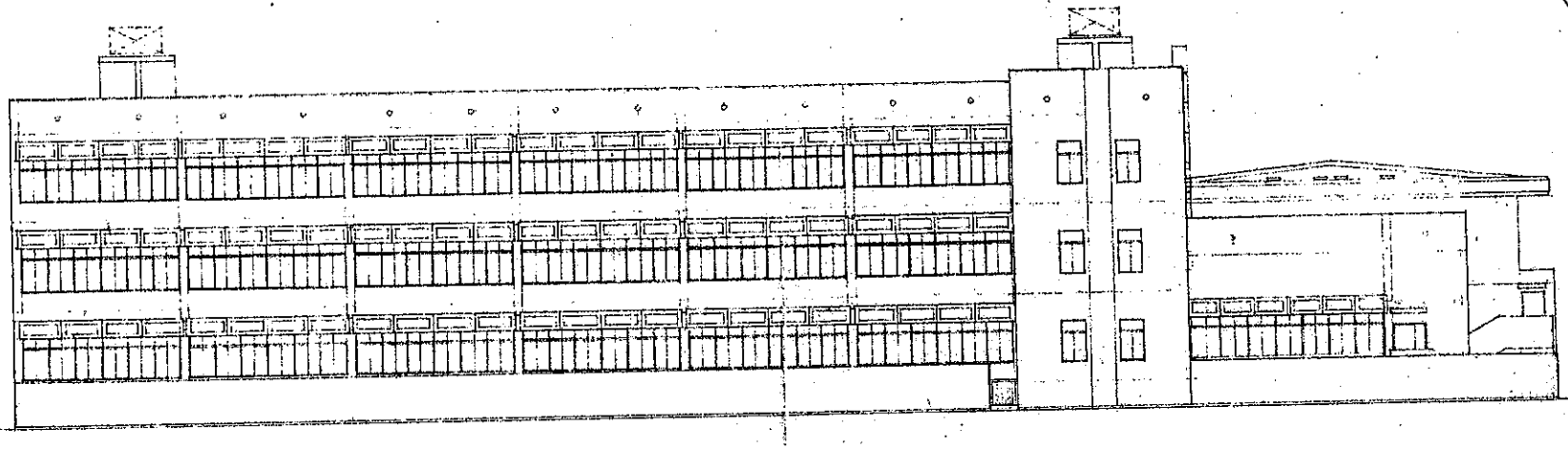
A-2

68

NORTH CLASS ROOM BLOCK

SCHOOL HALL BLOCK

⑥ 東立面

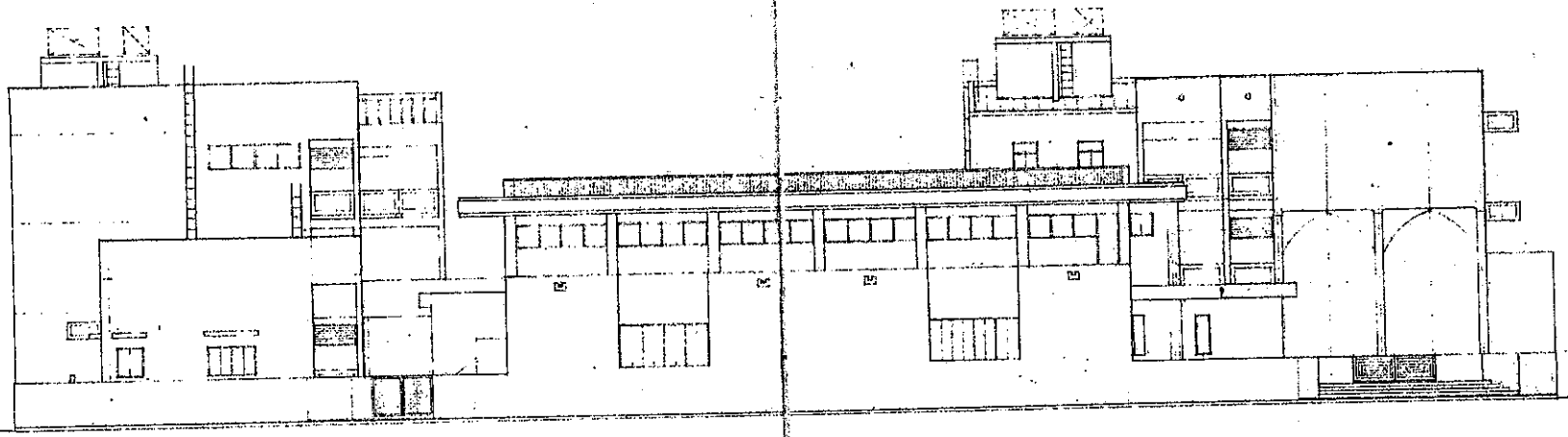


SOUTH ELE NORTH

NORTH CLASS ROOM BLOCK

SCHOOL HALL BLOCK

SOUTH CLASS ROOM BLOCK



WEST

KTN-42

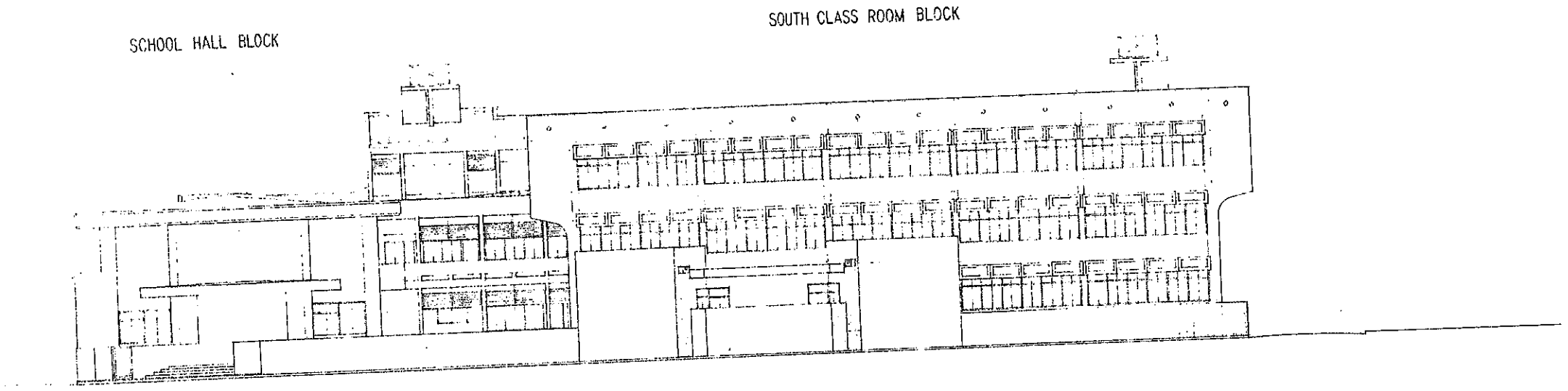
THE PROJECT FOR THE CONSTRUCTION OF

DATE

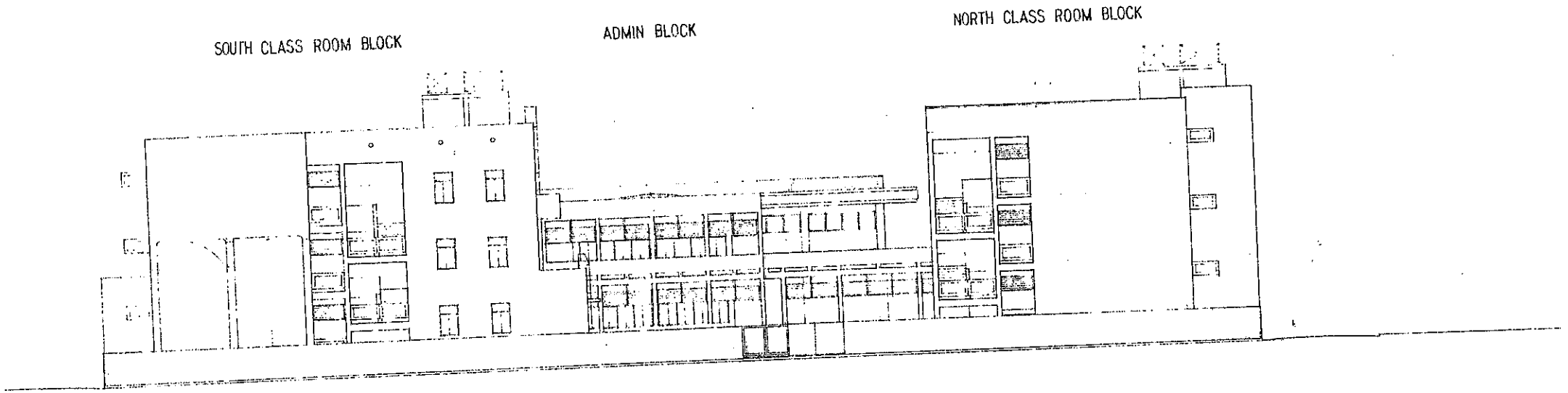
SCALE 1 : 200

DRAWN

6番立面

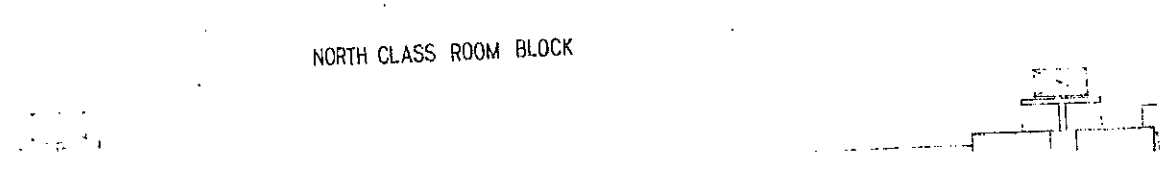


South



EAST

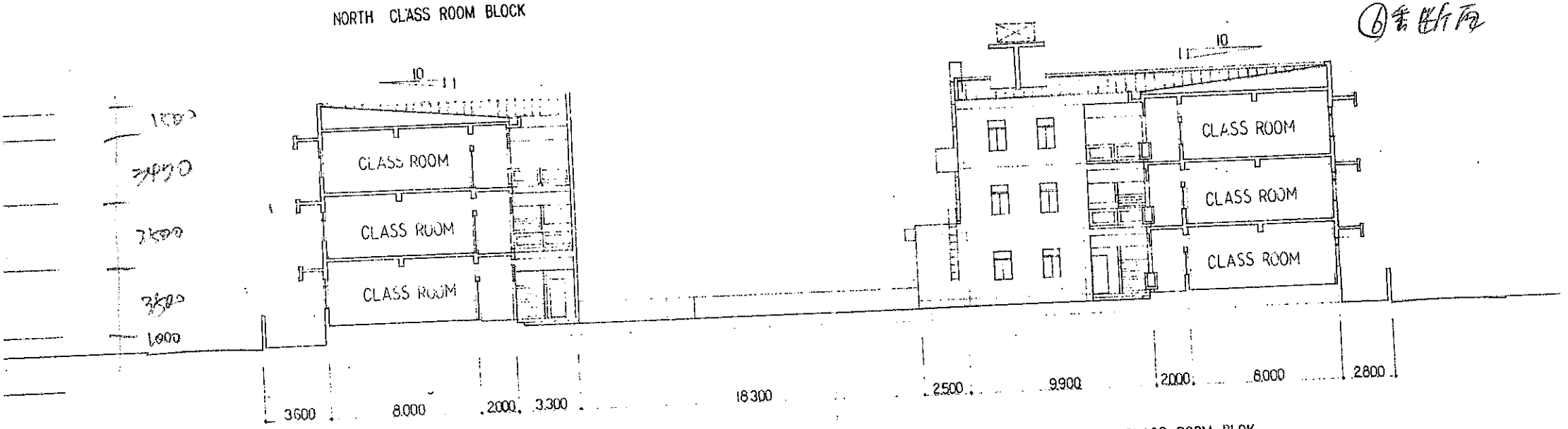
KTN-03



68

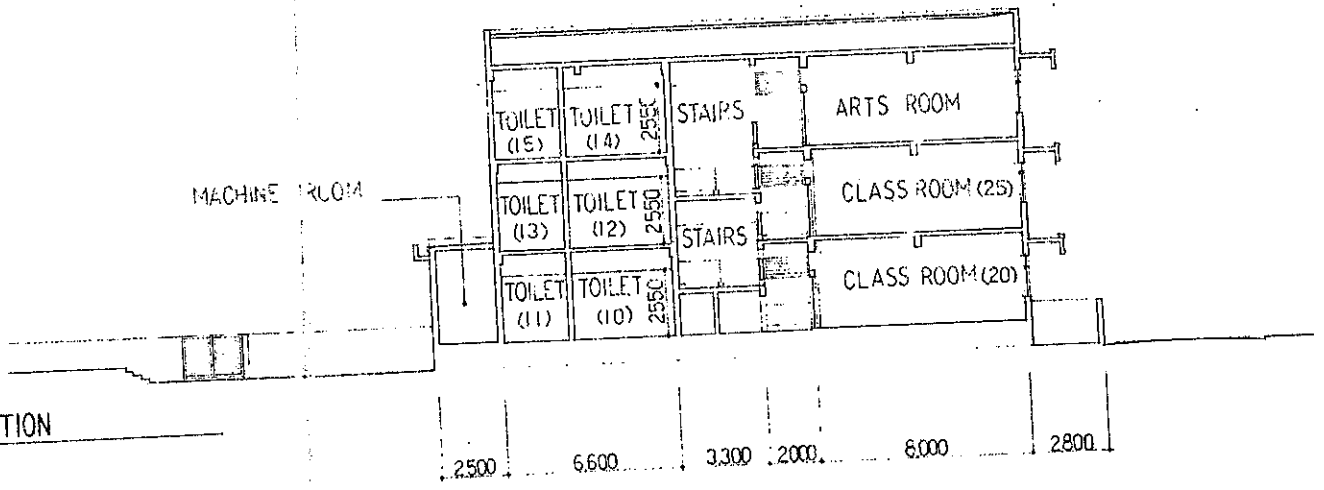
NORTH CLASS ROOM BLOCK

SOUTH CLASS ROOM BLOCK



SOUTH CLASS ROOM BLOK

MACHINE ROOM



4
A-2-8

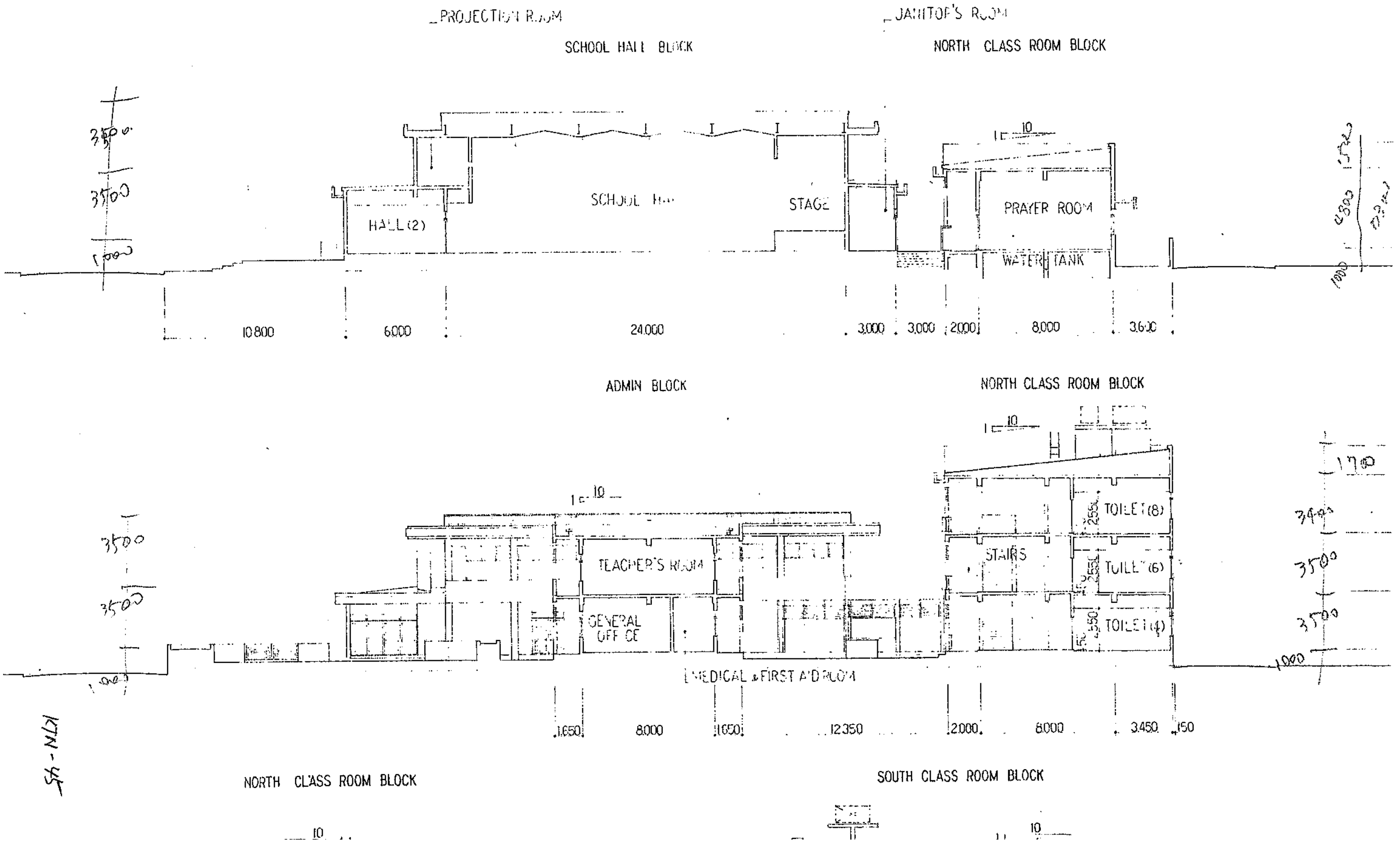
E SECTION

KTM-44

THE ... FOR THE CONSTRUCTION OF
THE ... SCHOOL IN ...

DATE 9.2.88 SCALE 1:200

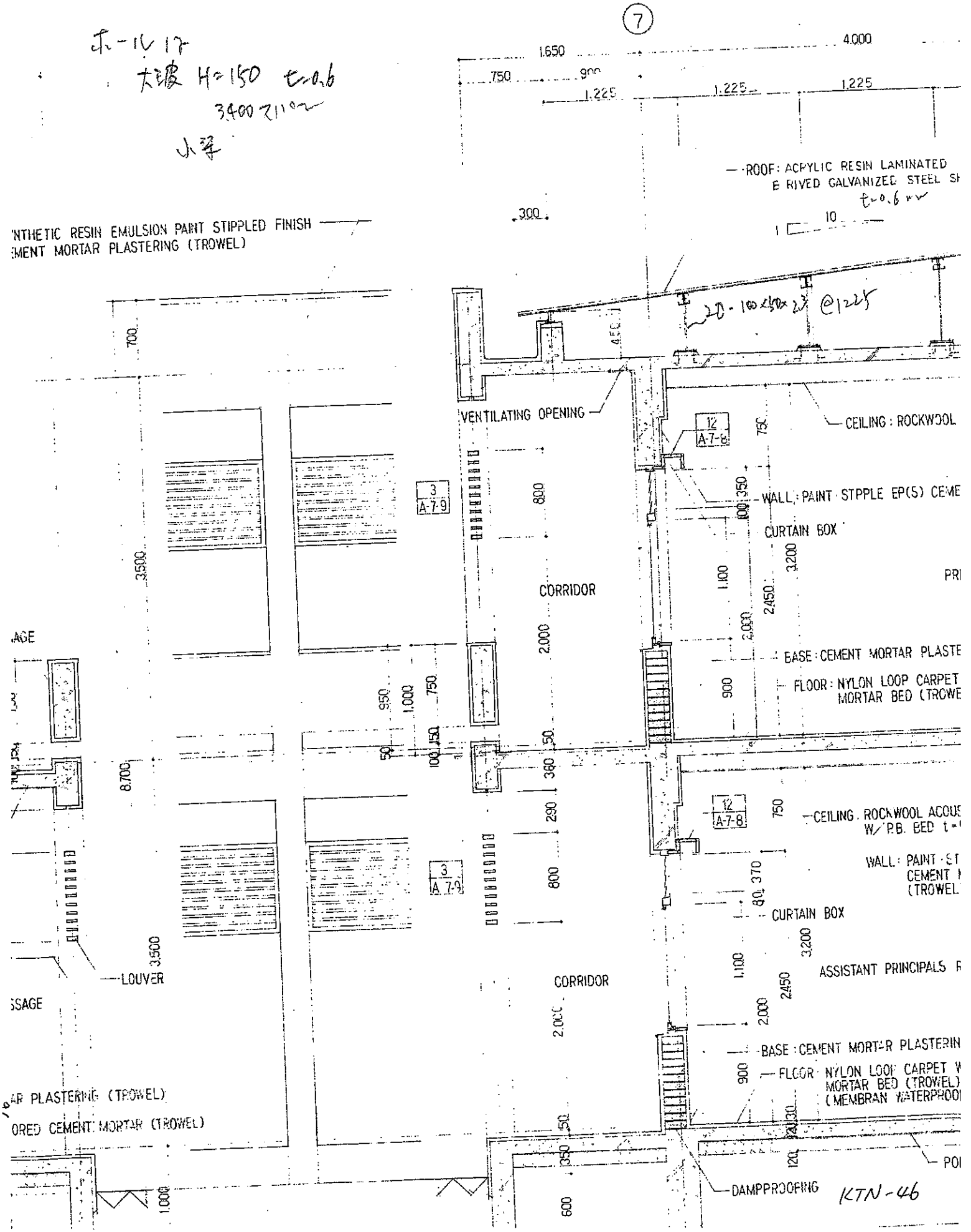
⑥ 断面

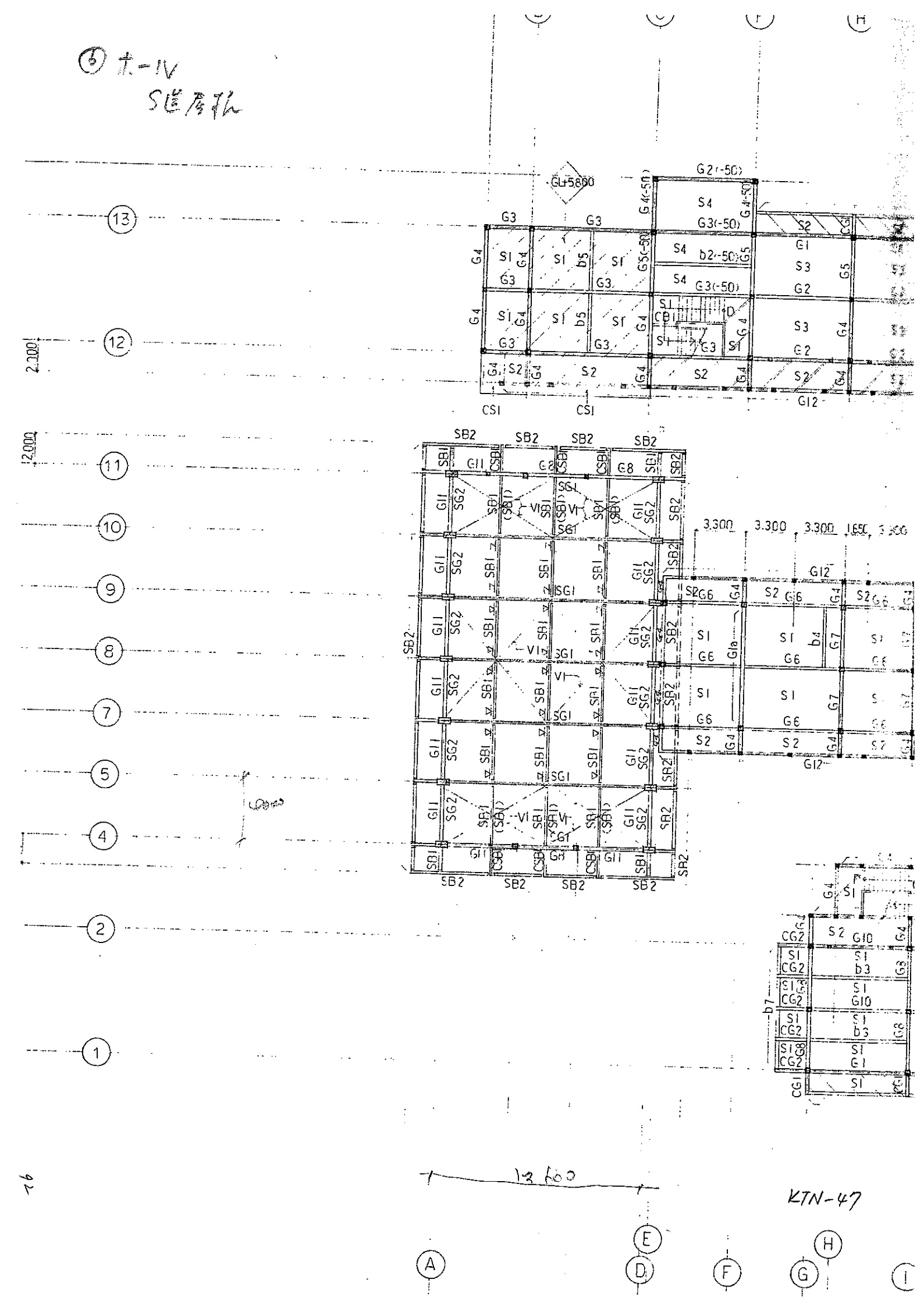

PROJECTION ROOM
SCHOOL HALL BLOCK
JANITOR'S ROOM
NORTH CLASS ROOM BLOCK
HALL (2)
SCHOOL HALL
STAGE
PRAYER ROOM
WATER TANK
10800
6000
24000
3000
3000
2000
8000
3600
3500
3500
1000
ADMIN BLOCK
NORTH CLASS ROOM BLOCK
TEACHER'S ROOM
GENERAL OFFICE
MEDICAL & FIRST AID ROOM
STAIRS
TOILET (8)
TOILET (6)
TOILET (4)
1650
8000
1650
12350
2000
8000
3450
150
NORTH CLASS ROOM BLOCK
SOUTH CLASS ROOM BLOCK

KTN-45

⑥ 矩計図

ホール17
大壁 H=150 t=0.6
3400マルヤ
小澤




⑤ ホ-IV
S造階段
GL+5800
G2(-50)
G4(-50)
S4
G3(-50)
S2
G1
S3
G2
G3
S1
b5
b2(-50)
CB1
CS1
G12
SB2
SG1
VI
SG2
G11
G8
3,300
3,300
3,300
1650
3,300
G6
G7
b4
S2
G10
b3
b7
CG2
CG1
13,200
KIN-47
A
D
E
F
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H
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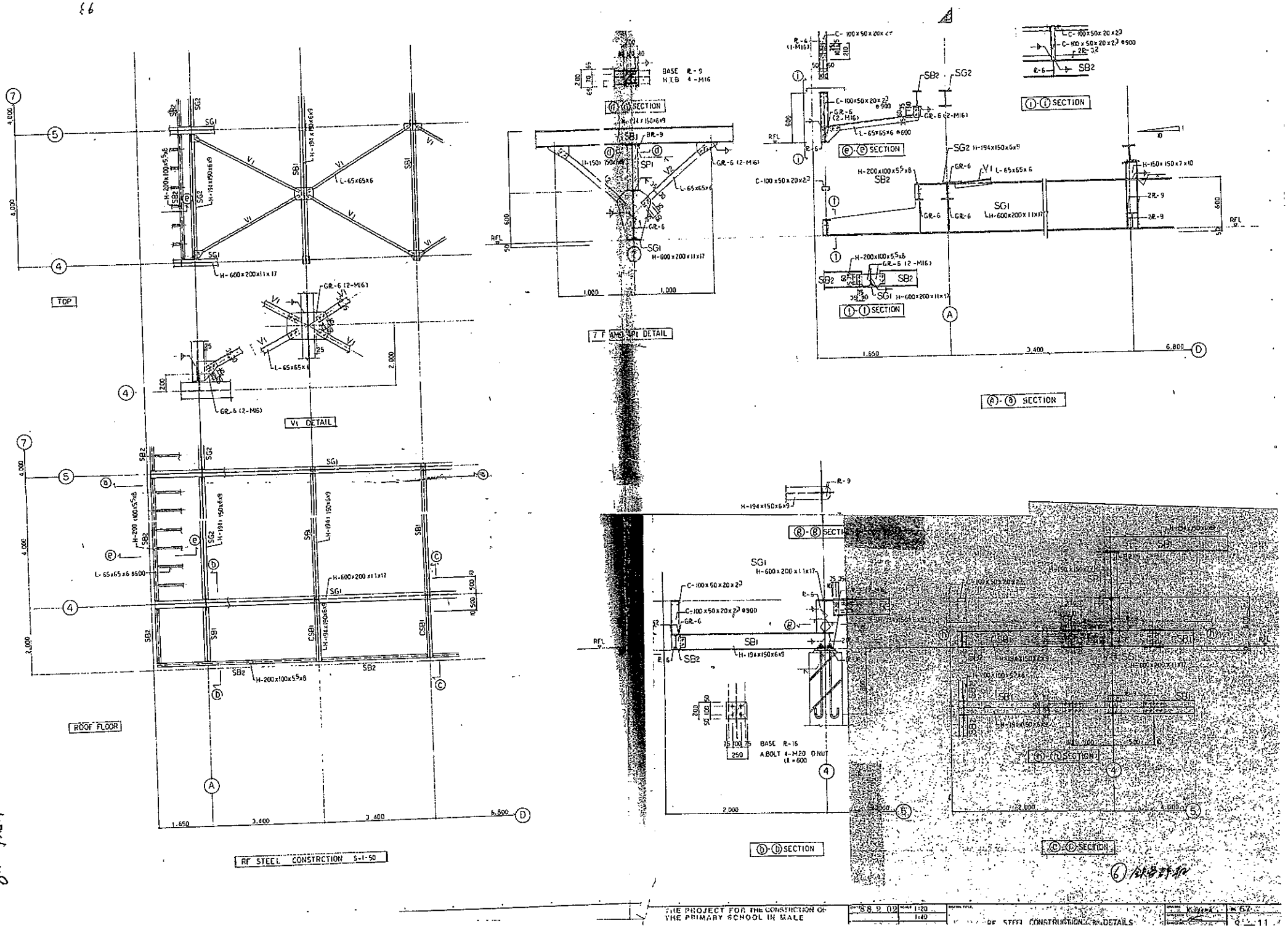
12
11
10
9
8
7
5
4
2
1
2,000
12,000


TOP
V1 DETAIL
ROOF FLOOR
RF STEEL CONSTRCTION S=1:50
7 F AND SP1 DETAIL
BASE R-9
H.T.B 4-M16
Ⓐ-Ⓐ SECTION
Ⓑ-Ⓑ SECTION
Ⓒ-Ⓒ SECTION
Ⓓ-Ⓓ SECTION
Ⓔ-Ⓔ SECTION
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THE PROJECT FOR THE CONSTRUCTION OF
THE PRIMARY SCHOOL IN MALE
RF STEEL CONSTRUCTION DETAILS