

DESIGN CALCULATION

of First Aid Garage,

Fire Fighting & Rescue Engineering

(STRUCTURE)

*Specification
of Structural Design of First Aid Garage*

I. The planar position of this depot refers to General Drawing, 0. 000 corresponding to absolute elevation 4.650.

II. Base

1. This project is designed based on << Shanghai Pudong International airport Supplementary Investigation Report of flying area (Building 7)>> provided by Shanghai branch of China Aviation Industry Investigation & Design Institute.

2. The Foundation should be located on layer 2-1 of brown-yellow powder clay. Base load-bearing capacity standard value = 90kpa.

3. Treatment must be done of the open trench within the foundation area. Firstly drain water and clear silt, then backfill with clay or sand and ram. Density of the treated base must be near 2-1 layer soil's density.

4. Open trench at site should be backfilled as soon as possible.

III. Materials

1. Concrete: Foundation C20, others C25, bedcourse concrete C10.

2. Reinforcing steel Grade I, Grade II; Steel plates A3, welding rod E4303.

3. Brick masonry: MU7.5 red brick shall be used above 0.000 together with M5 mixed mortar. MU7.5 red brick shall be used below 0. 000 together with M5 cement mortar.

IV. Concrete protection layer of load-bearing members' main bar: beam & column below +0.00: 35; above +0.00 25; slab 15.

V. Structural column (GZ) must be grouted after the wall is laid, and racking bond with the wall. The upper and lower anchors of vertical bars of structural column shall go in 35d to ground ring beam and ring beam.

VI. The aseismic structure not noted in this introduction and drawing shall be constructed as National Standards CG329.

VII. Equipment foundation shall be constructed after the arrival of the equipment and check.

VIII. National standard S831: 600m³-IIB pool shall be adopted for 600 m³ fire-fighting pool.

IX. A structural column shall be provided at every 3000-4000 along parapet and rooted in the ring beam of roof.

X. Close coordination between each speciality shall be maintained during construction.

Structure Design Calculation-----10-May-97

- I. Item Name: First Aid garage
- II. Structure type: one-floor brick & concrete structure
- III. Foundation type: R.C. Strip foundation
- IV. Aseismic intensity: 7
- V. Site soil type: IV
- VI. Soil endurance: $R=90\text{KPa}$
- VII. Structure importance parameter: $R_0=1.0$
- VIII. Absolute altitude of base's load-bearing layer : 2.950m
- IX. Materials: column: C20 concrete; beam & slab: C20 concrete
wall: clay brick 240mm (5.24KN/m²)

X. Load:

1. Live load:	roof	0.70KN/m ²
2. Dead load:	roof ceiling	0.30KN/m ²
	structure slab (110mm)	2.75KN/m ²
	roof (roof 1)	2.00KN/m ²
total		5.75KN/m ²

XI. Selection of main members

- 1. R. C. structure column 240x240mm - 240x900mm
- 2. Main beam ($L=8100\text{mm}$) b \times h=250x700
- 3. Slab thickness: h=110mm

XII. Design basis

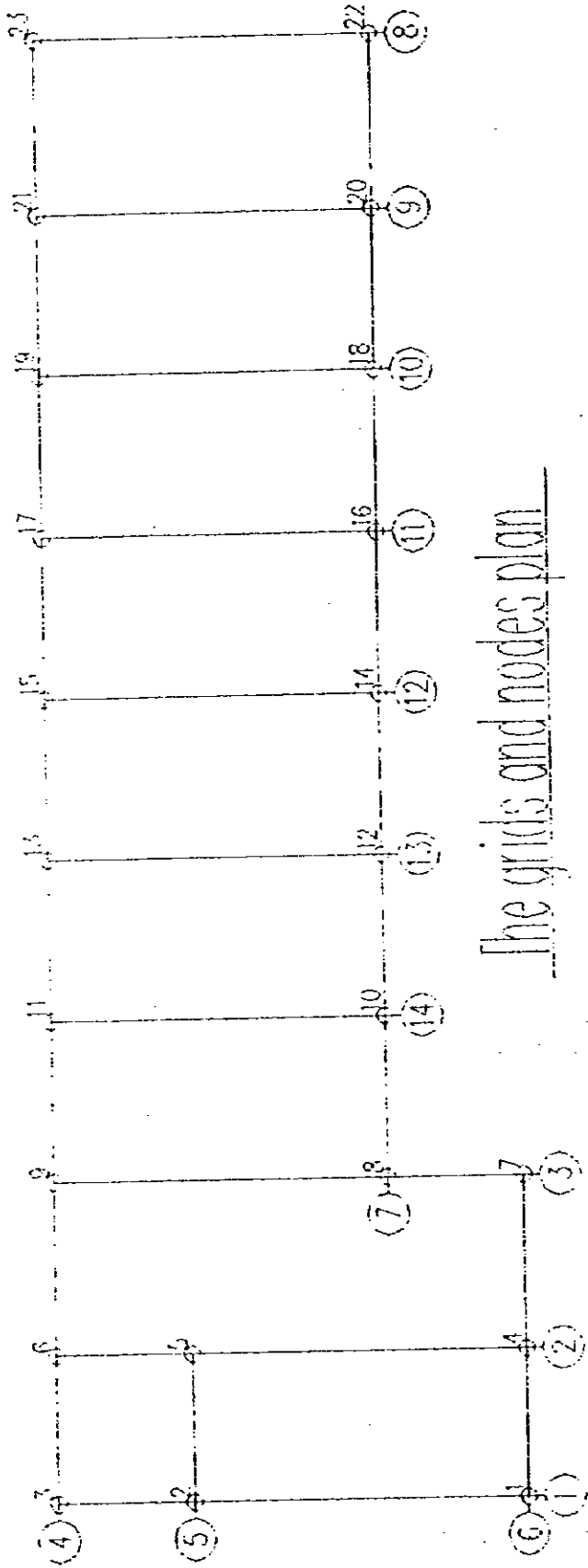
- 1. Current national architecture & structure standards and codes;
- 2. Shanghai City's<<Base Foundation Design Codes>>DBJ08-11-89;
- 3. Shanghai City's<<Base Treatment Technical Codes>>DBJ08-40-94;
- 4. Shanghai City's<<Building Aseismic Design Standards>>DBJ08-09-92

XIII. Computer programs

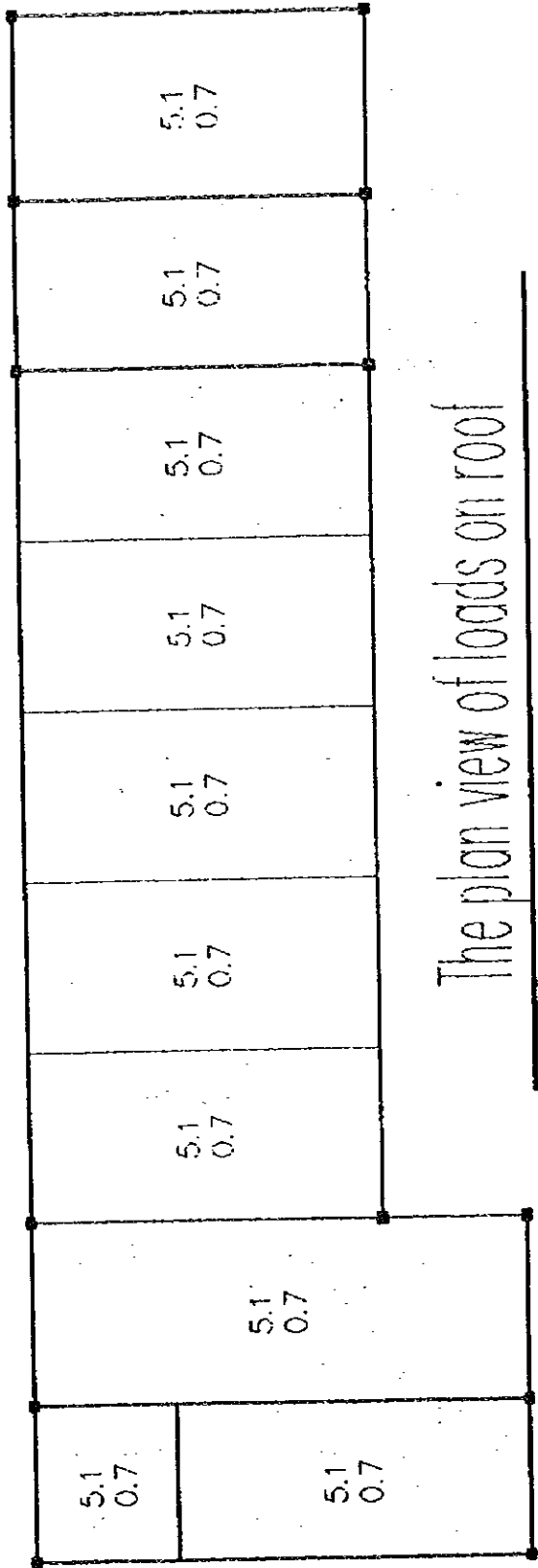
- China Building Science Research Institute CAD Engineering Department
- 1.PMCAD March, 1997
- 2.PK March, 1997
- 3.JCCAD March, 1997

XIV. Conclusion:

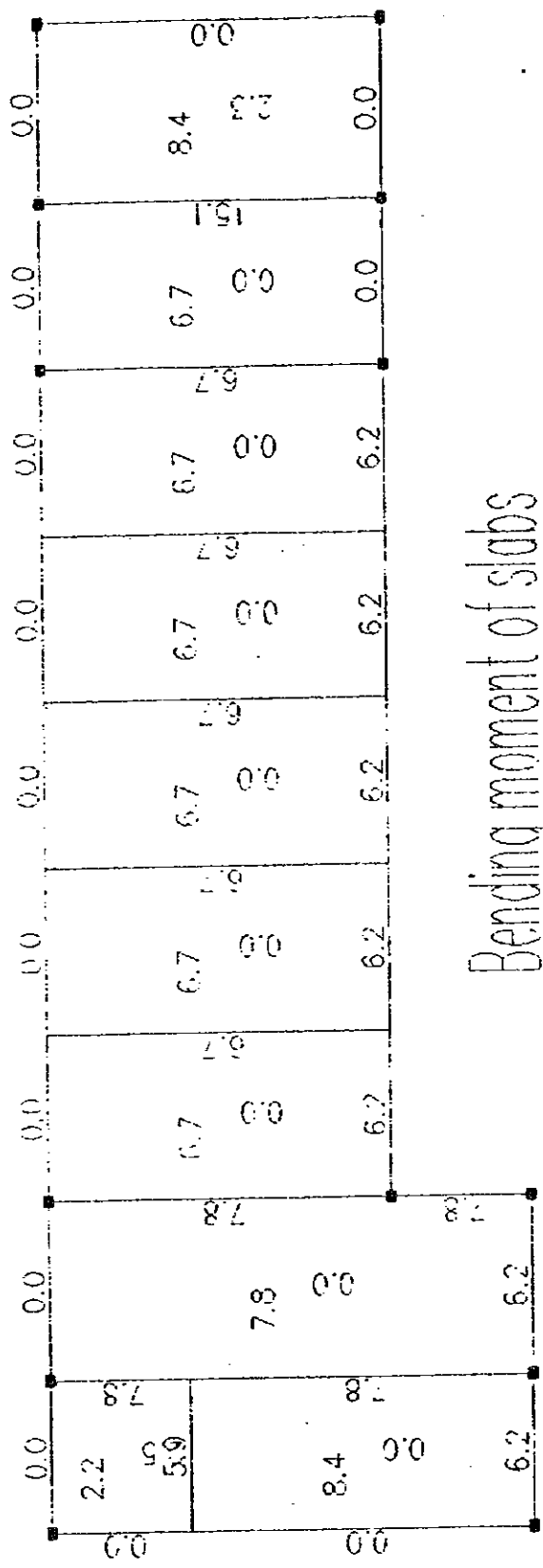
It is concluded from calculation above, the integral strength and deformation of structure meet the design requirements, the geometric dimensions also meet the requirements of strength and deformation regulated by Codes. The primary data of structural model, major calculation results, combining results of main internal forces of each member, structural layout, internal force drawing, reinforcing results of major members refer the next page, based on which construction drawings are made.



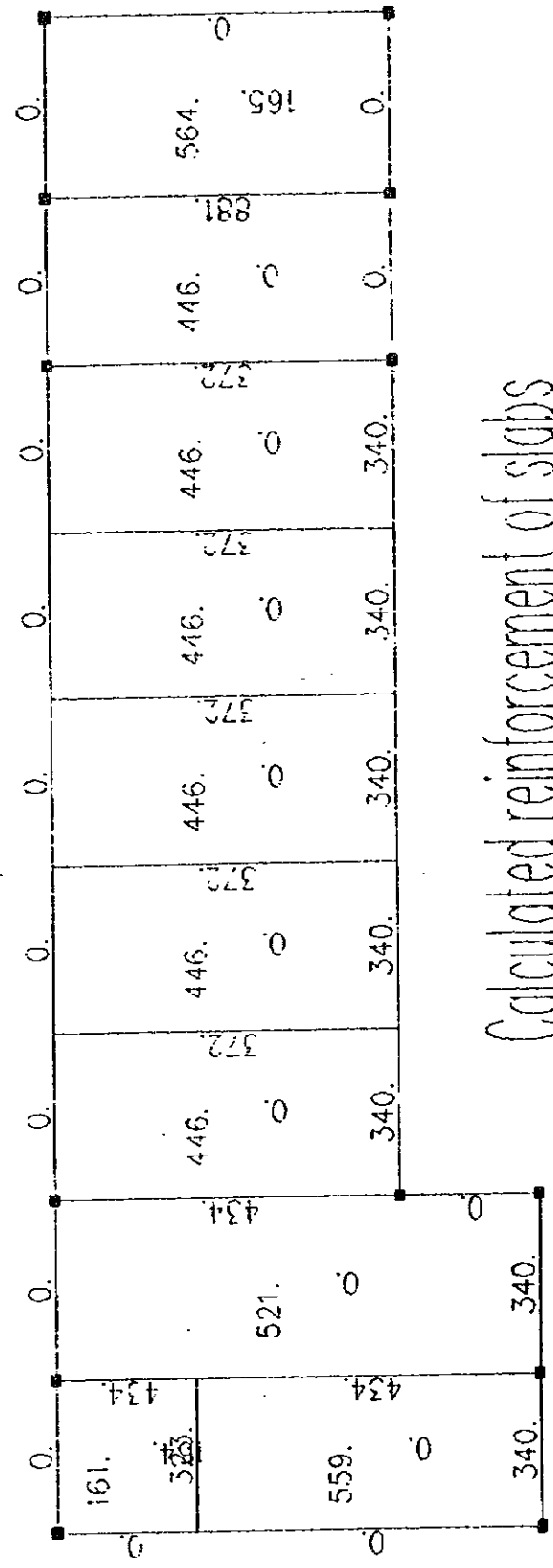
The grids and nodes plan



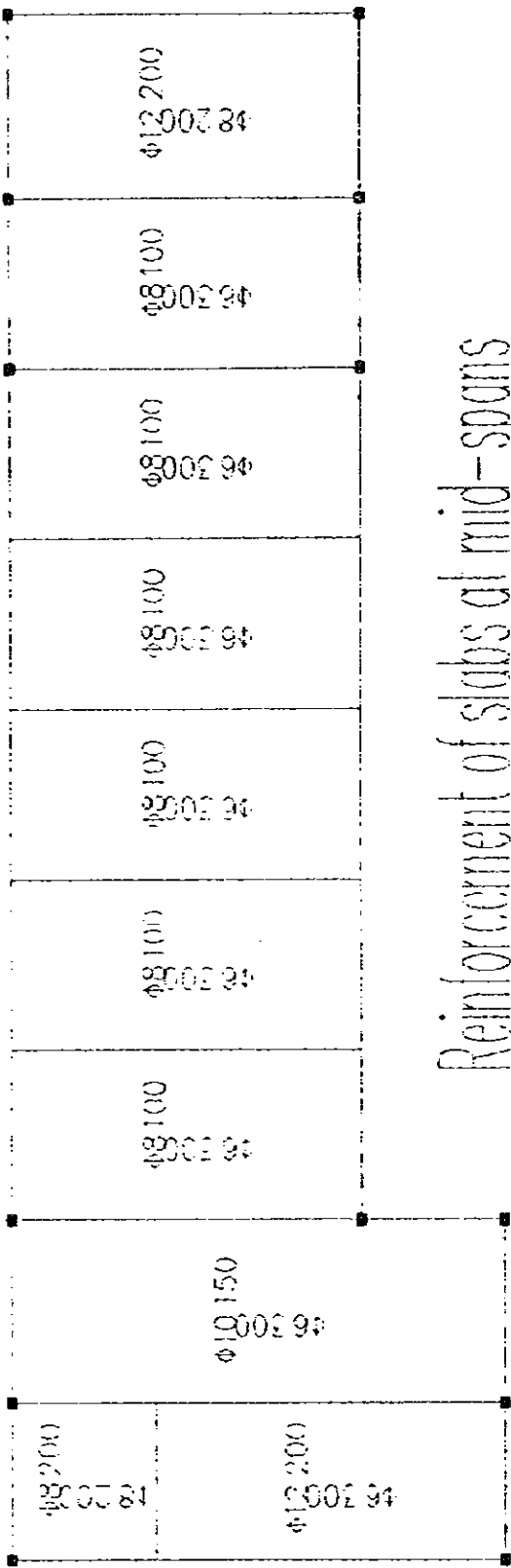
The plan view of loads on roof



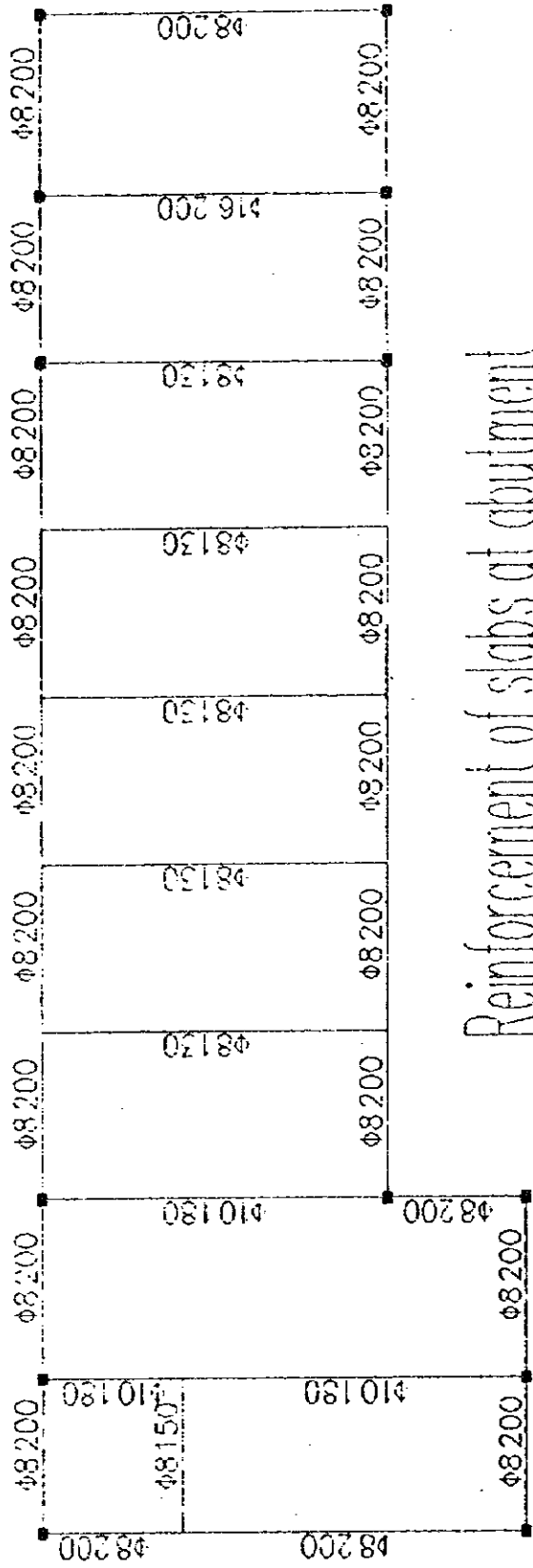
Bending moment of slabs



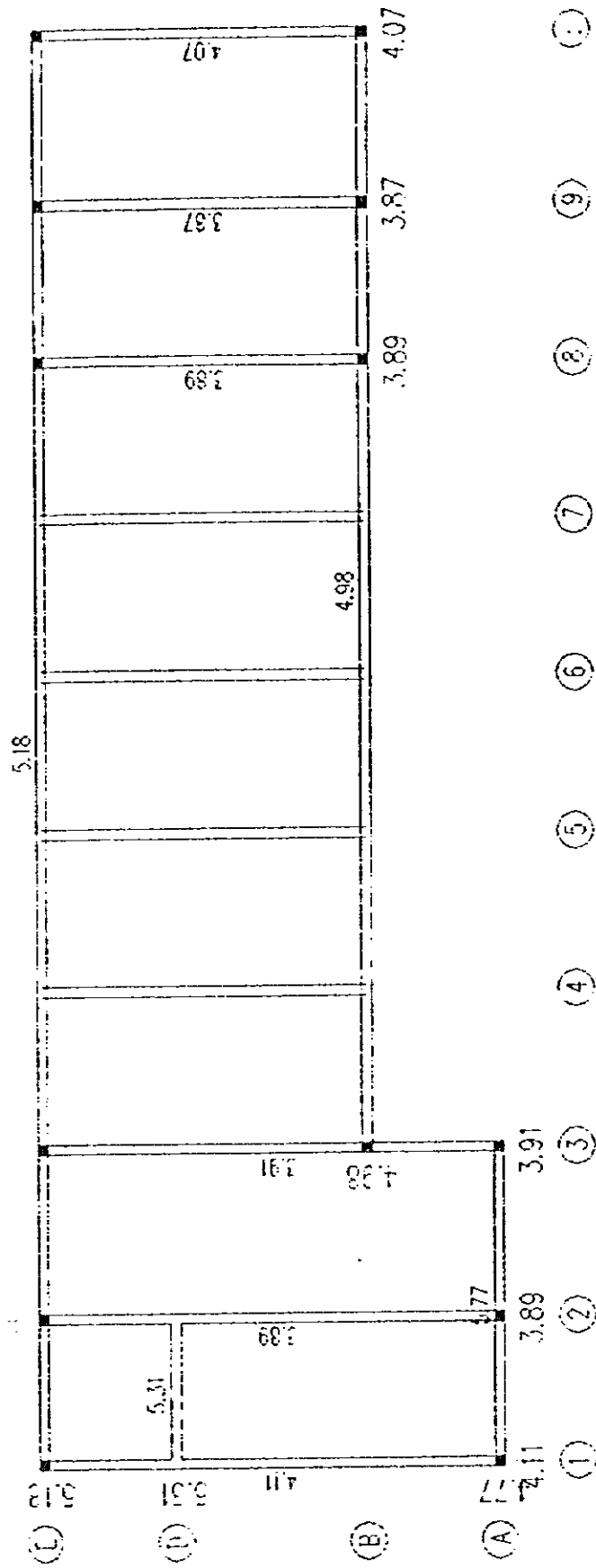
Calculated reinforcement of slabs



Reinforcement of slabs at mid-spans

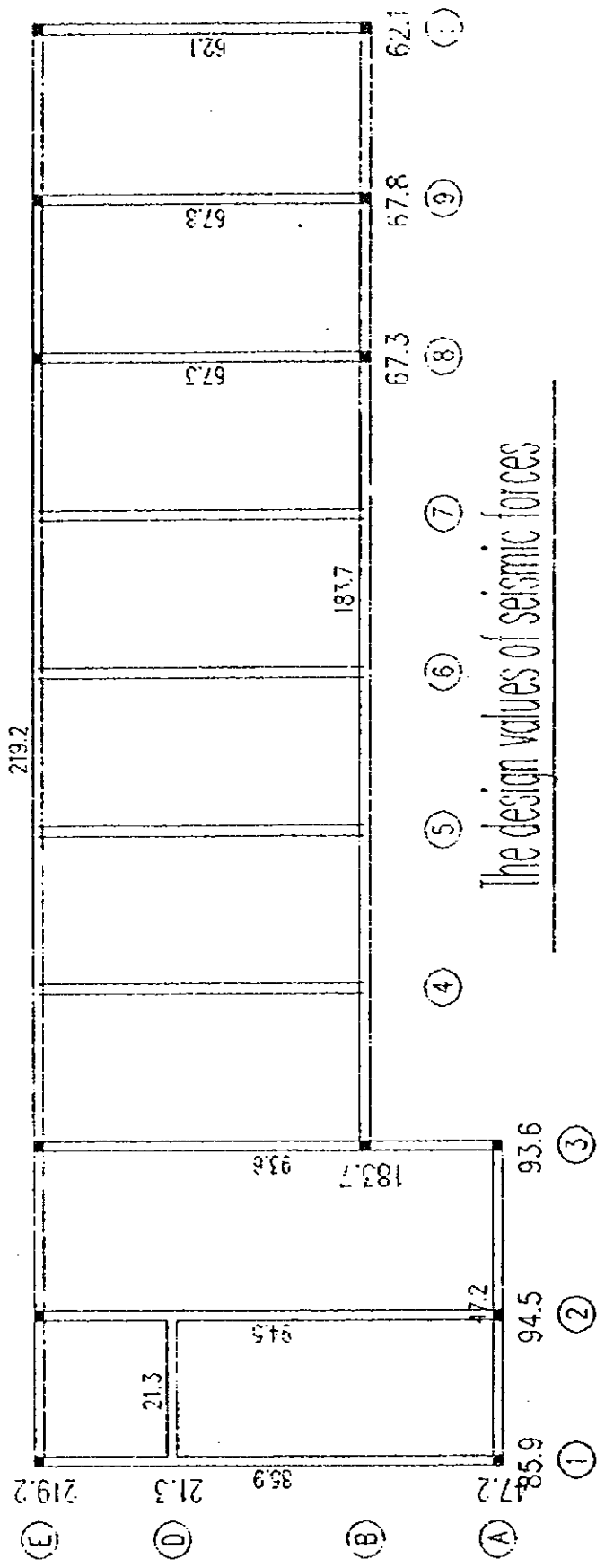
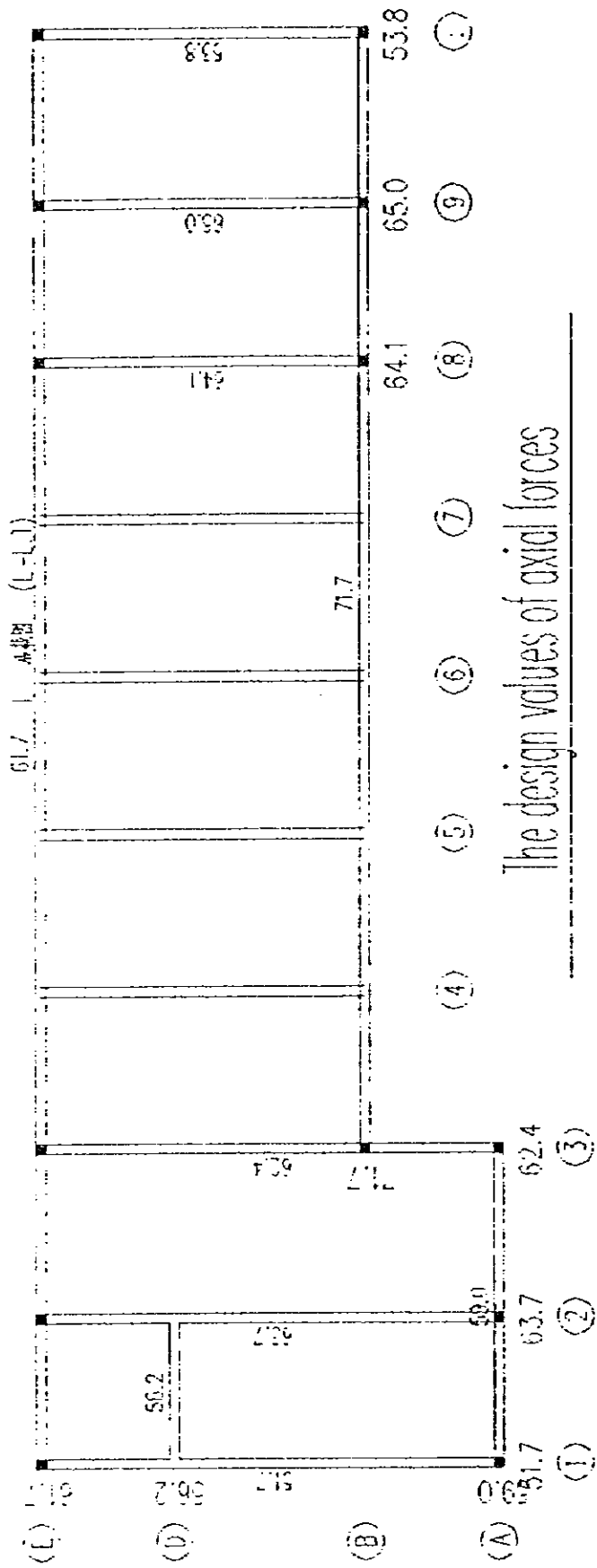


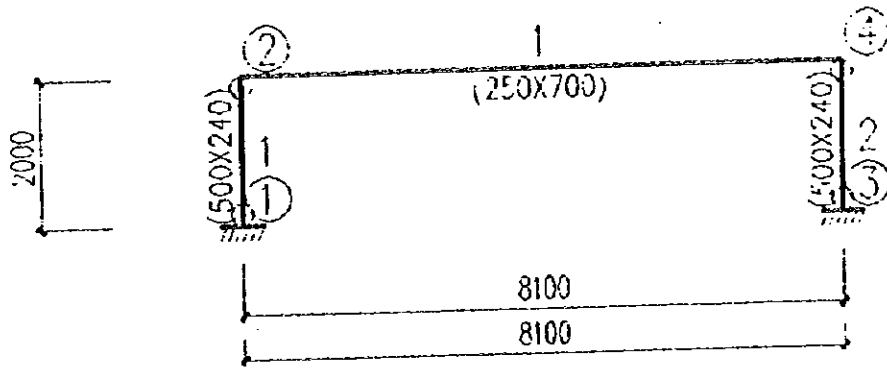
Reinforcement of slabs at abutment



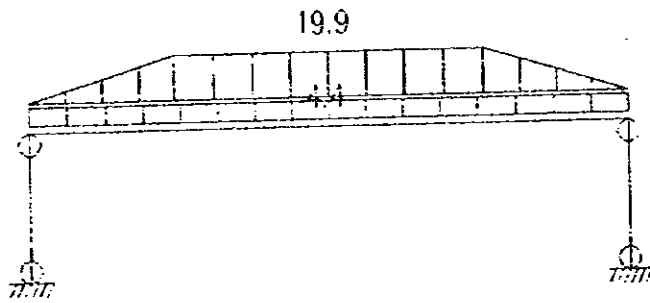
$G1 = 4534.3$ $F1 = 362.7$ $V1 = 362.7$ $LD = 7.0$ $GD = 2.0$ $M = 5.0$

The result of anti-seismic analysis

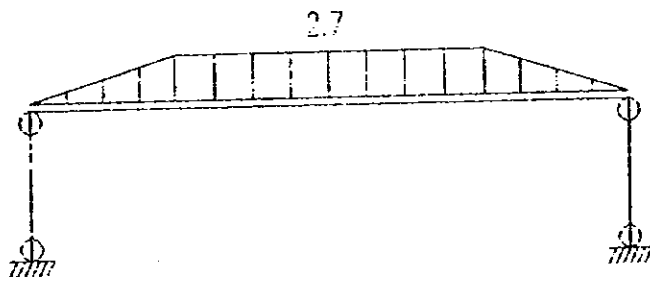




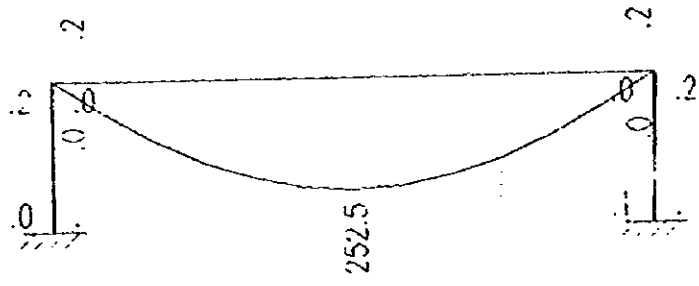
Elevation of beam



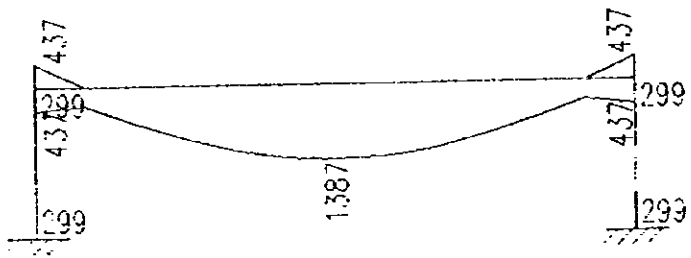
Dead load diagram



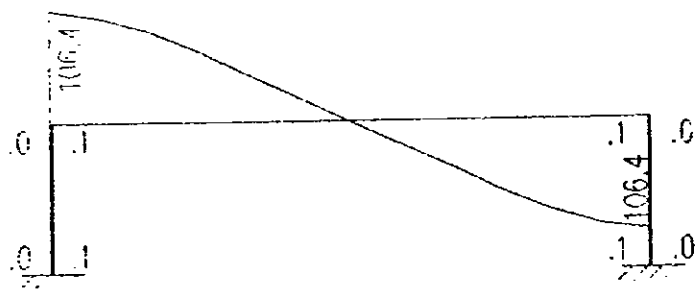
Live load diagram



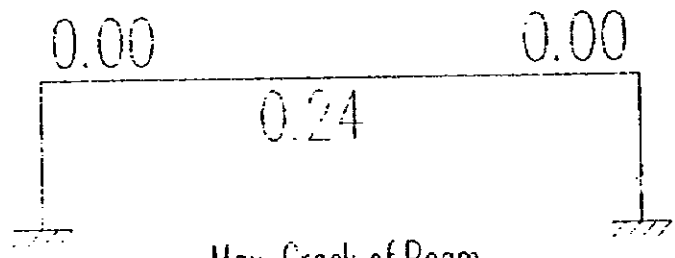
Bending moment envelope



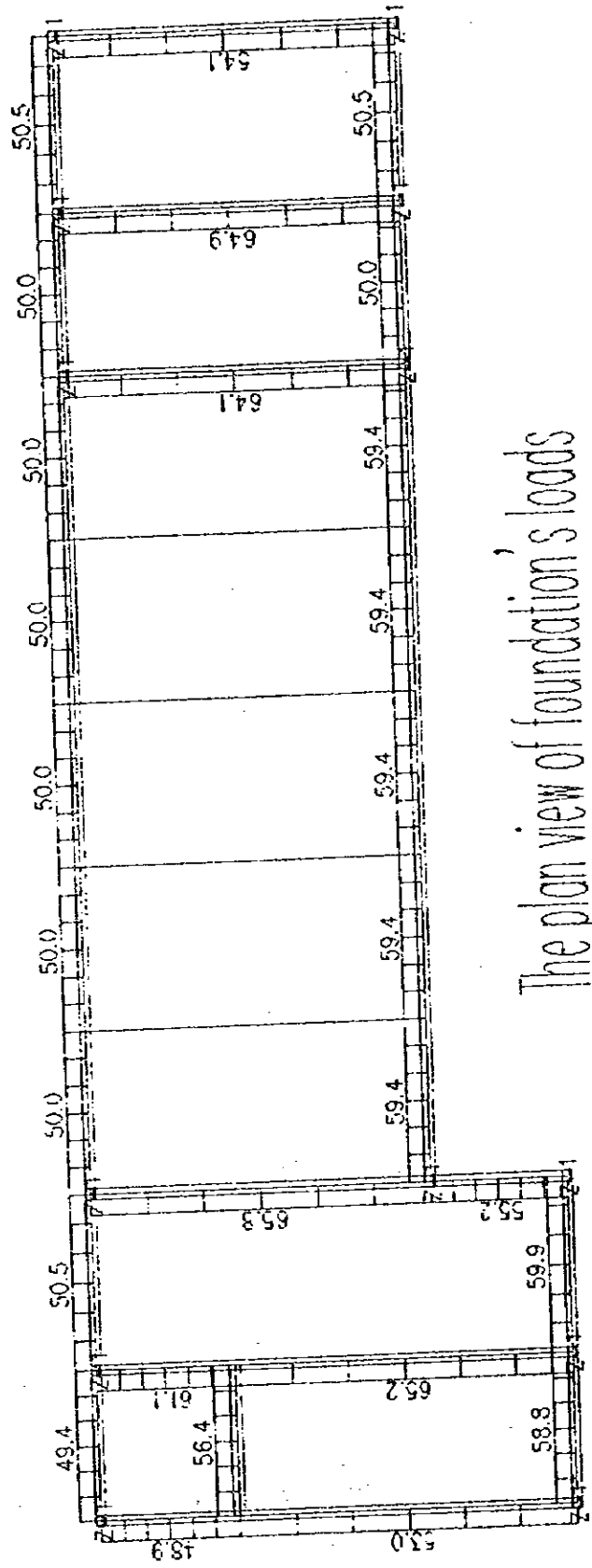
Reinforcement envelope



Shear force envelope



Max. Crack of Beam



The plan view of foundation's loads

Program "PM" Data

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 D MYD BLKD DWS BLP

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C---(MSH(i),i=1,MST)

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2,	-6.845,	7.780
3,	-6.845,	11.080
4,	-3.245,	-0.320
5,	-3.245,	7.780
6,	-3.245,	11.080
7,	0.955,	-0.320
8,	0.955,	2.980
9,	0.955,	11.080
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15,	12.655,	11.080
16,	16.555,	2.980
17,	16.555,	11.080
18,	20.455,	2.980
19,	20.455,	11.080
20,	24.355,	2.980
21,	24.355,	11.080
22,	28.555,	2.980
23,	28.555,	11.080

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3,	3,	7,	8,	9,							
4,	10,	3,	6,	9,	11,	13,	15,	17,	19,	21,	23,
5,	2,	2,	5,								
6,	3,	1,	4,	7,							
7,	8,	8,	10,	12,	14,	16,	18,	20,	22,		
8,	2,	22,	23,								
9,	2,	20,	21,								
10,	2,	18,	19,								

11, 2, 16, 17,
 12, 2, 14, 15,
 13, 2, 12, 13,
 14, 2, 10, 11,

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C---(BE(i),i=1,KBE)
 1.000, 6.000, 0.250, 0.700,

C---((HSLD(i,j),j=1,3),i=1,MLOD)
 1.000, 5.100, 0.700,

C---QUE JEI DIAN

0

C=====C
 C LAYER 1
 C=====C

C---BHOU RWB BHC IC ICC IG
 0.110, 20.0, 0.015, 20.0, 20.0, 2

C---((AXIS(I),I=1,NAXIS)

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3,	3,	7,	8,	9,							
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5,	2,	2,	5,								
6,	3,	1,	4,	7,							
7,	8,	8,	10,	12,	14,	16,	18,	20,	22,		
8,	2,	22,	23,								
9,	2,	20,	21,								
10,	2,	18,	19,								
11,	2,	16,	17,								
12,	2,	14,	15,								
13,	2,	12,	13,								
14,	2,	10,	11,								

0

C--- ZHU ---
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 40810, 1, 0.000, 0.000
 60103, 1, 0.000, 0.000
 701, 1, 0.000, 0.000
 70608, 1, 0.000, 0.000

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C--- LIANG ---
 1101, 1, 0.000
 1201, 1, 0.000
 1301, 1, 0.000
 1401, 1, 0.000

0

C--- QIANG ---

10102,	0.240,	0.000
20102,	0.240,	0.000
30102,	0.240,	0.000
40109,	0.240,	0.000
501,	0.240,	0.000
60102,	0.240,	0.000
70107,	0.240,	0.000
801,	0.240,	0.000
901,	0.240,	0.000
1001,	0.240,	0.000

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C--- DONG KOU ---

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C-----C

C---KZDJ NV IB IY INF CC
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(1) 2 4

OUTPUT DATA

(1) IIII (2) 3III

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OUTPUT DATA

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(2) 1.00 -.50 .24 .00 .00 .00

OUTPUT DATA

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IIQQ- 15
STIF COMPUTE
DEAD COMPUTE

JOINT LOAD: JR XM XN

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COLUMN LOAD: JC KL P X KX

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BEAM LOAD: NE LI KL P X P1 XI KL

P X P1 XI
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1.95

..DEAD LOAD..

STIF COMPUTE
LIVE COMPUTE

JOINT LOAD: JR XM XN

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COLUMN LOAD: JC KL P X KX

0

BEAM LOAD: NE LI KL P X P1 XI KL

P X P1 XI
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EART COMPUTE
COMBI COMPUTE

..COMBINATION AND REINFORCEMENT..

COLUMN 1 (B= .500, H= .240, Lx= 2.00, Ly= 2.00)

NO 1 As= 0. M= -.08 N= 94.82 NO 1 As= 0.
M= -.17 N= -94.82
GG= 300.

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BEAM 1 (B= .250, H= .700, L= 8.10)

BOTTOM

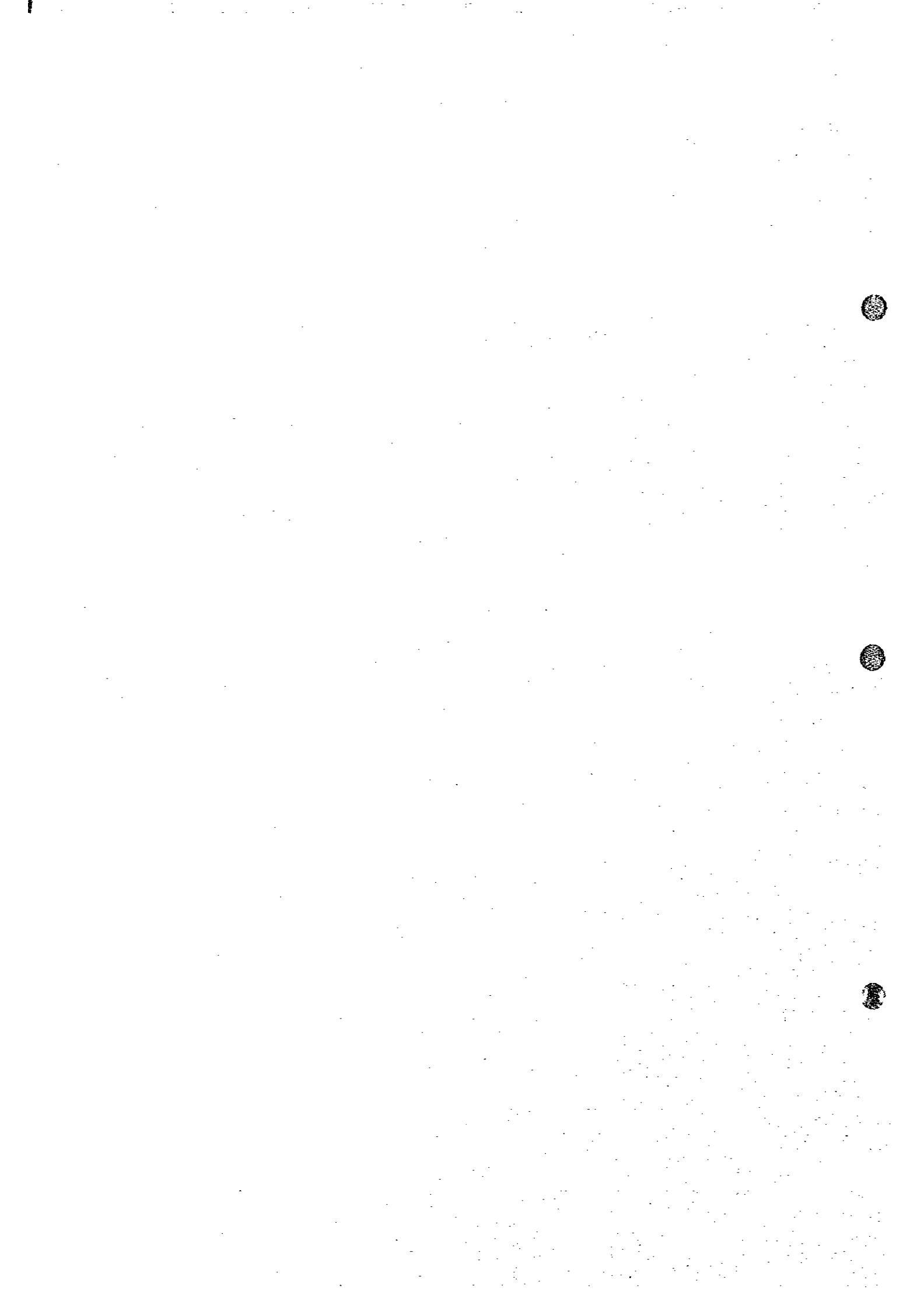
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As(1)=	438.	349.	684.	978.	1201.	1341.	1388.	1341.	1201.	978.
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TOP

SECTION	1	2	3	4	5	6	7	8	9	
10	11	12	13							
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As(1)=	438.	0.	0.	0.	0.	0.	0.	0.	0.	0.
As(2)=	438.	0.	0.	0.	0.	0.	0.	0.	0.	0.

Vl= 106.44 NO 1 Vr= 106.44 NO 3 Asv/s= .00 As(3)= 438. Umaxb
= .008 Umaxt= .002
PK1 COMPUTE END

・消防ポンプ室 構造計算書



DESIGN CALCULATION

of Fire Pump Station,

Fire Fighting & Rescue Engineering

(STRUCTURE)

Specification of Structural Design of Fire Pump Station

I. The planar position of this pump house refers to General Drawing, 0.000 corresponding to absolute elevation 4.850.

II. Base

1. This project is designed based on << Shanghai Pudong International airport fire-fighting Rescue works and North & South Pump station Investigation Report, Chapter I: Fire-fighting Rescue works >> provided by Shanghai branch of China Aviation Industry Investigation & Design Institute.

2. Foundation of the pump station:

. The Foundation should be located on layer 2-1 of brown-yellow powder clay. Base load-bearing capacity standard value = 90kpa.

. Treatment must be done of the open trench within foundation area. Firstly drain water and clear silt, then backfill with clay or sand and ram. Density of the treated base must be near 2-1 layer soil's density.

3. Foundation of water tank:

. Excavate until 100 under the top level of 2-3 layer, then backfill with clay or sand in layers and ram to foundation bottom in a compacting factor of 0.96. Load-bearing capacity of the treated base should be no less than 100 KPa.

. Reduction of underground water level should be well done and can't be stopped in order to avoid drift sand and not to affect the stability of base pit.

4. Open trench at site should be backfilled as soon as possible.

III. Materials

1. Concrete: Foundation C20, others C25, bedcourse concrete C10.

2. Reinforcing steel Grade I, Grade II; Steel plates A3, welding rod E4303.

3. Brick masonry: MU7.5 red brick shall be used above 0.000 together with M5 mixed mortar. MU7.5 red brick shall be used below 0.000 together with M5 cement mortar.

IV. Concrete protection layer of load-bearing members' main bar: beam & column below -0.00: 35; above +0.00 25; slab 15.

V. Structural column (GZ) must be grouted after the wall is laid, and racking bond with the wall. The upper and lower archors of vertical bars of structural column shall go in 35d to ground ring beam and ring beam.

VI. The aseismic structure not noted in this introduction and drawing shall be constructed as National Standards CG329.

- VII. Equipment foundation shall be constructed after the arrival of the equipment and check.
- VIII. National standard S831: 600m³-IIB pool shall be adopted for 600 m³ water tank.
- IX. A structural column shall be provided at every 3000- 4000 along parapet and rooted in the ring beam of roof.
- X. Close coordination between each speciality shall be maintained during construction.

Structure Design Calculation—10-May-97

I. Item Name: Fire Pump Station

II. Structure type: one-floor brick & concrete structure

III. Foundation type: R.C. Strip foundation

IV. Aseismic intensity: 7

V. Site soil type: IV

VI. Soil endurance: $R=90\text{KPa}$

VII. Structure importance parameter: $R_0=1.0$

VIII. Absolute altitude of base's load-bearing layer: 3.350m

IX. Materials: column: C20 concrete; beam & slab: C20 concrete
wall: clay brick 240mm (5.24KN/m^2)

X. Load:

1. Live load:	roof	0.70KN/m^2
2. Dead load:	roof ceiling	0.30KN/m^2
	structure slab (120mm)	3.00KN/m^2
	roof (roof 1)	2.00KN/m^2
total		6.00KN/m^2

XI. Selection of main members

1. R. C. structure column $240\times 240\text{mm} - 240\times 600\text{mm}$

2. Main beam ($L=8100\text{mm}$) $b\times h=300\times 750$

3. Slab thickness: $h=120\text{mm}$

XII. Design basis

1. Current national architecture & structure standards and codes;
2. Shanghai City's <<Base Foundation Design Codes>> DBJ08-11-89;
3. Shanghai City's <<Base Treatment Technical Codes>> DBJ08-40-94;
4. Shanghai City's <<Building Aseismic Design Standards>> DBJ08-09-92;

XIII. Computer programs

China Building Science Research Institute CAD Engineering Department

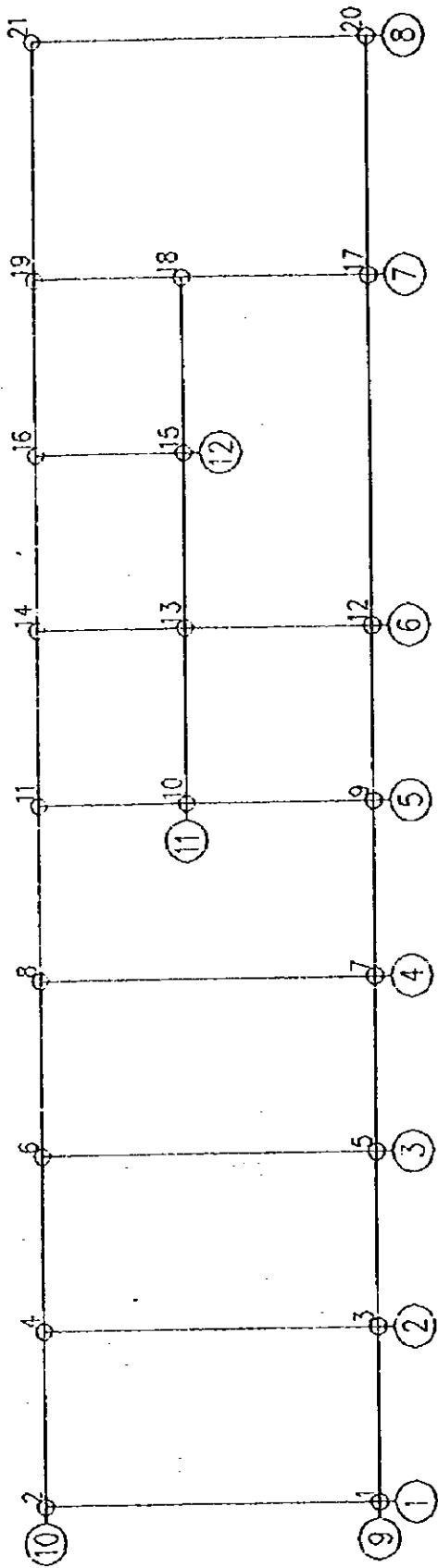
1. PMCAD March, 1997

2. PK March, 1997

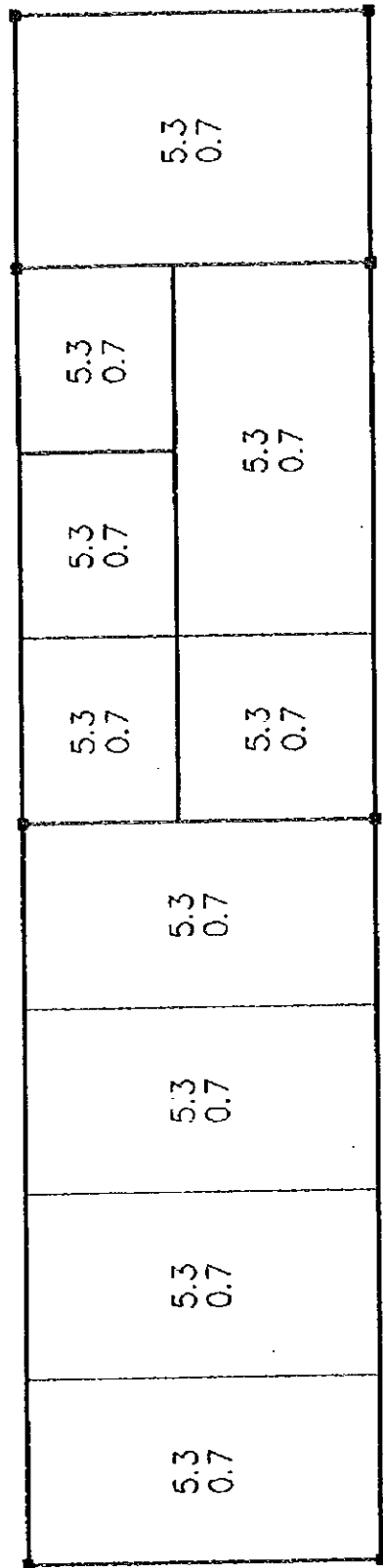
3. JCCAD March, 1997

XIV. Conclusion:

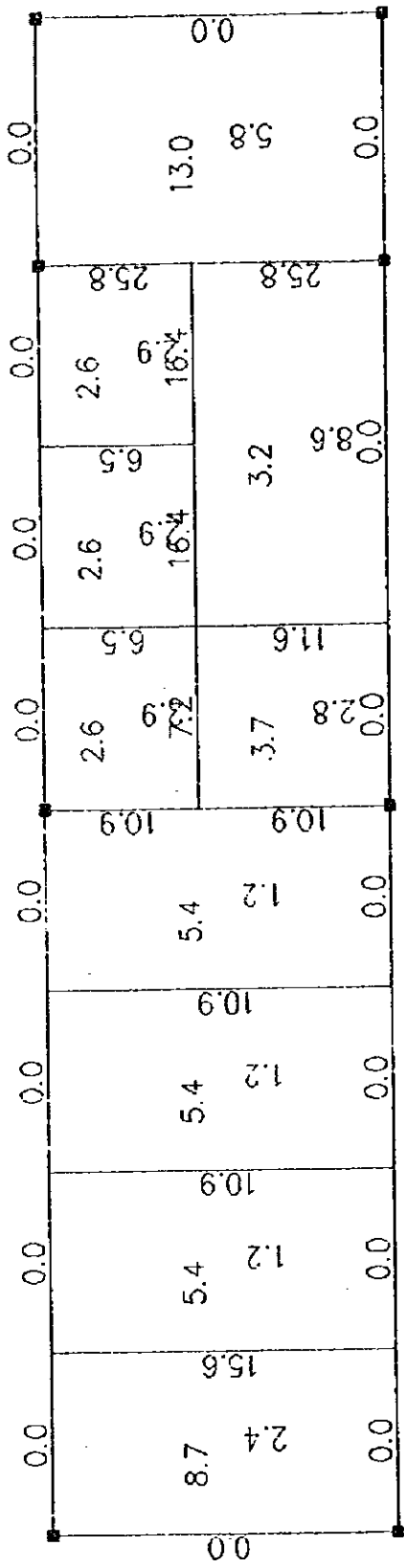
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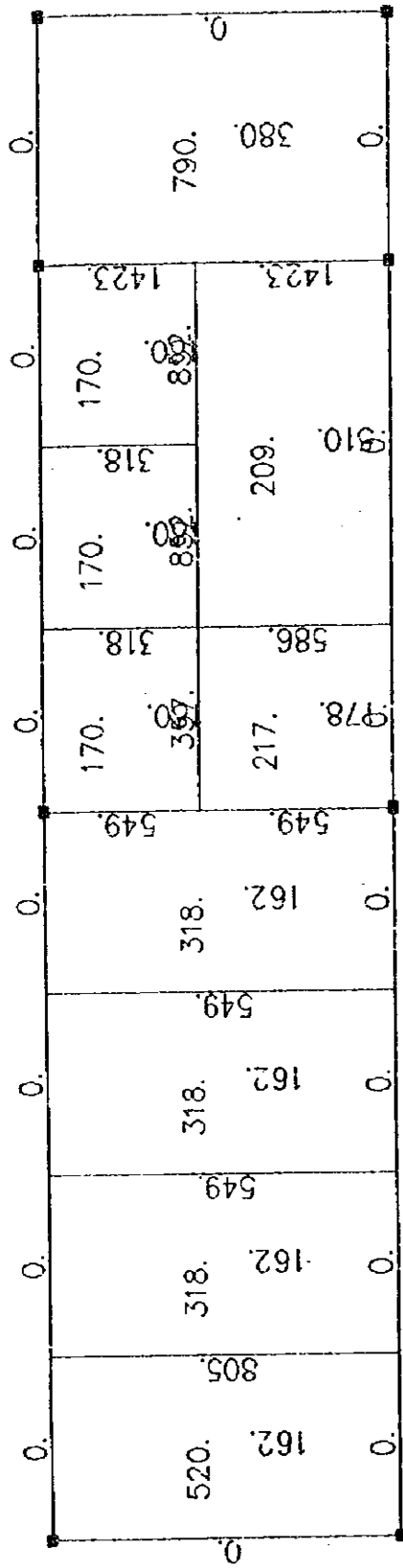
The planar nets and nodes diagram



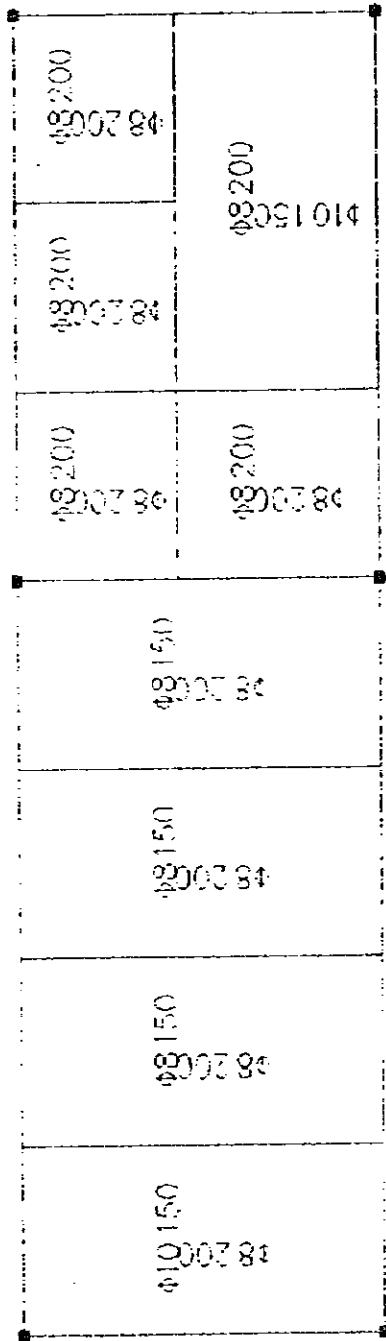
The plan view of loads on roof



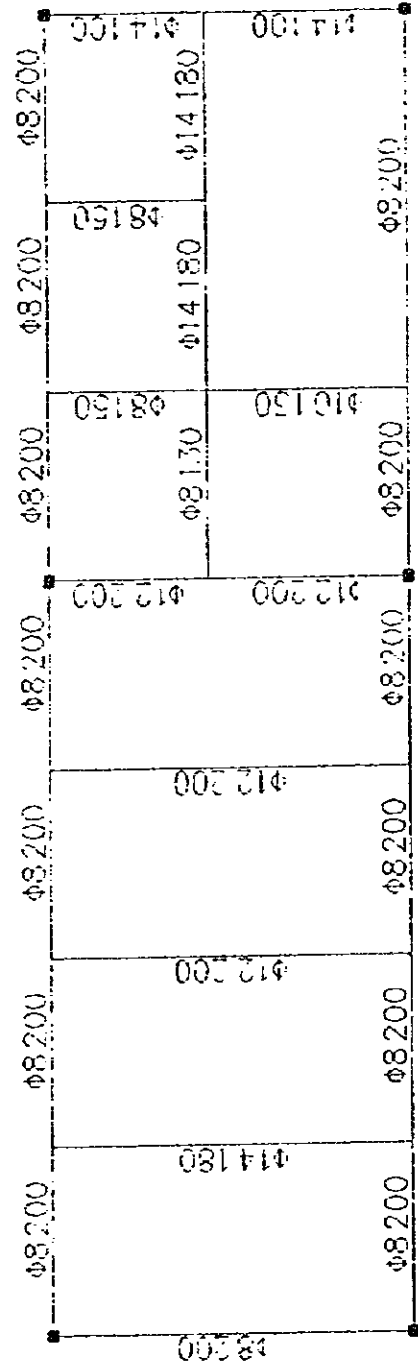
Bending moment of slabs



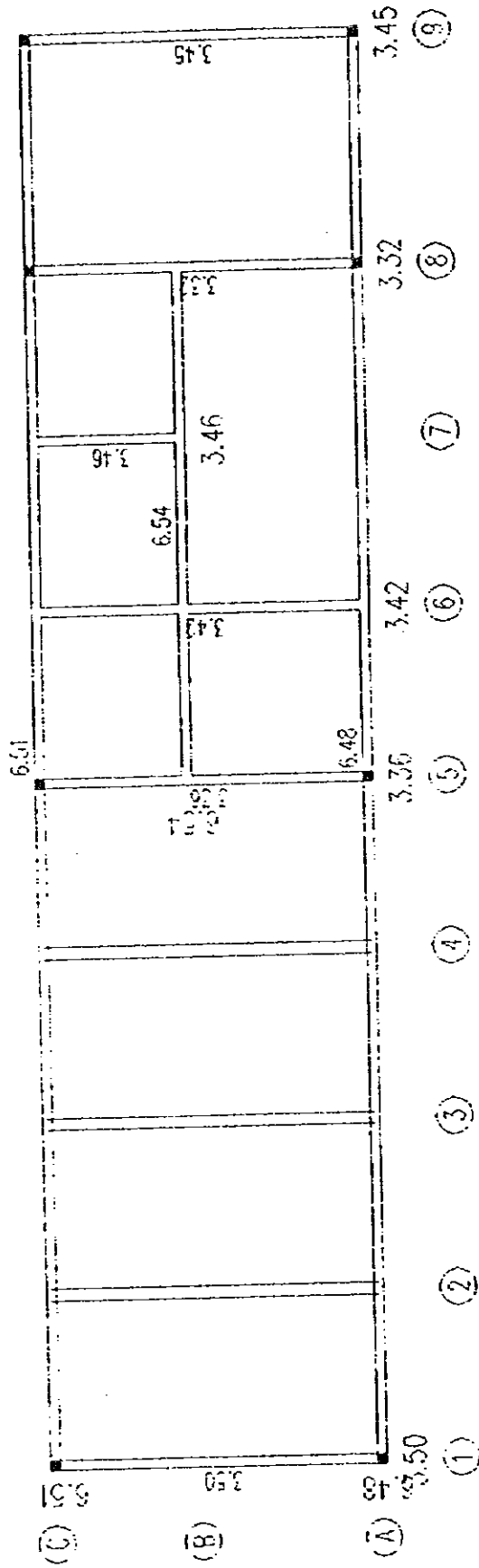
Calculated reinforcement of slabs



Reinforcement of slabs at mid-spans

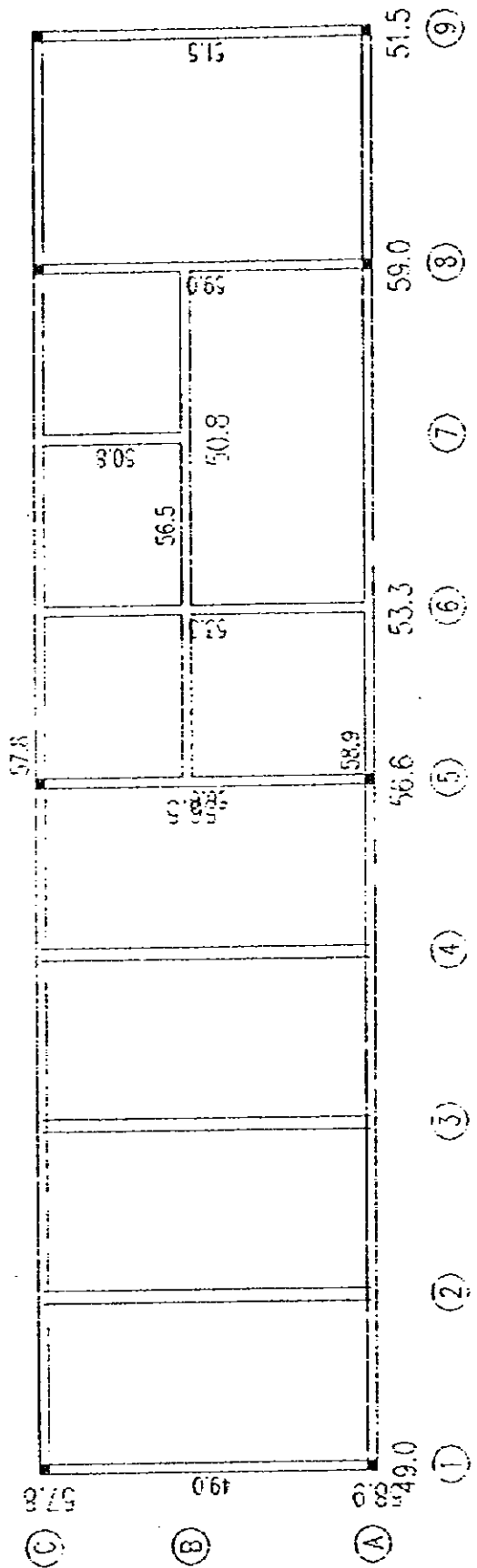


Reinforcement of slabs at abutment

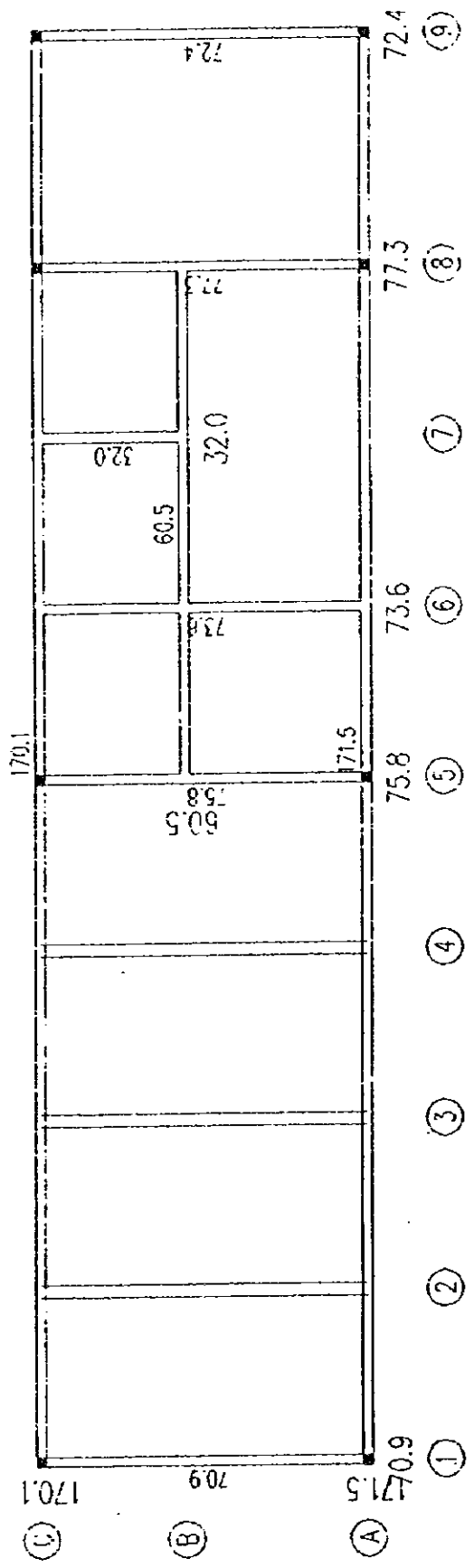


G1=3868.2 F1=309.4 V1=309.4 LD=7.0 GD=2.0 M=5.0

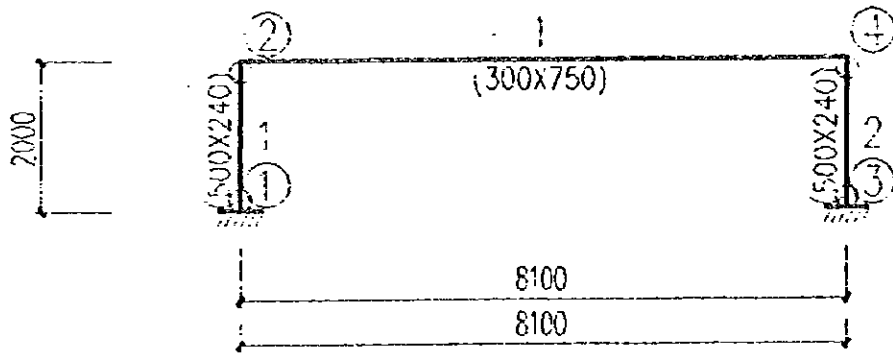
The result of anti-seismic analysis



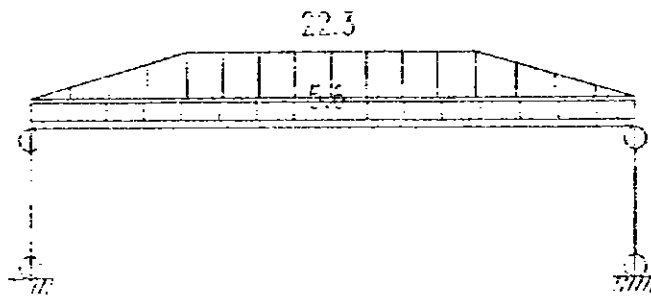
The design values of axial forces



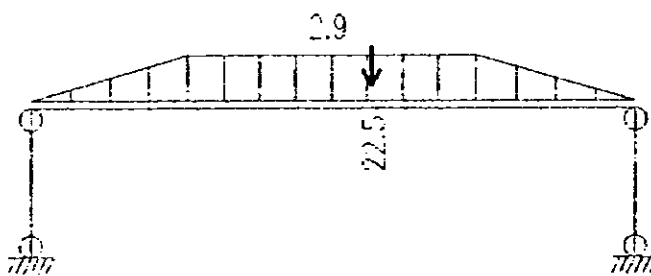
The design values of seismic forces



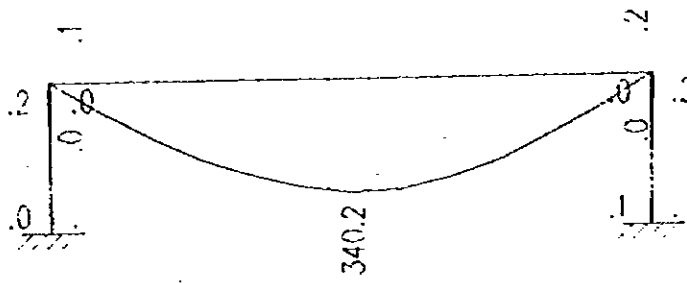
Elevation of beam



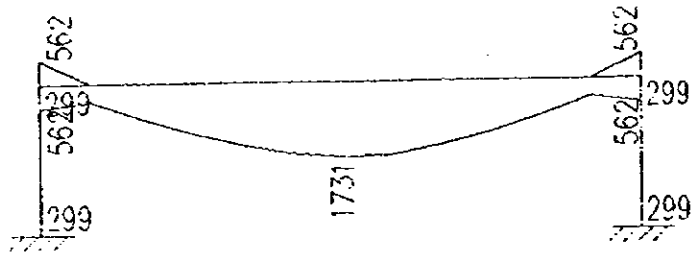
Dead load diagram



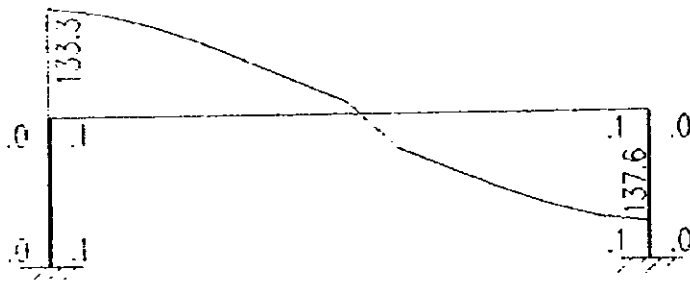
Live load diagram



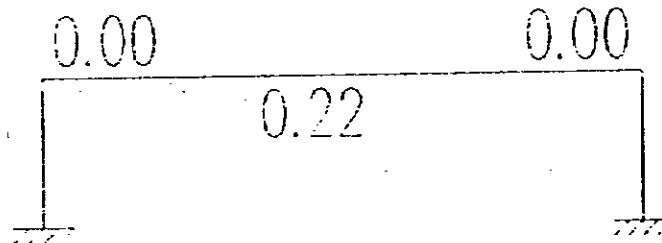
Bending moment envelope



Reinforcement envelope



Shear force envelope



Max. Crack of Beam

Program "PM" Data

C---NST MST NAXIS NYS KCL KBE KDK MLOD ALIVE MX
 D MYD BLKD DWS BLP

-1, 1, 12, -1, 1, 1, 0, 1, 1.00, 1, 1, 0.00, 1.00, 100.0

C---(HLA(i),i=1,NST)

6.000,

C---(MSH(i),i=1,MST)

1,

C---((XY(I,J),J=1,2),I=1,NJ)

1,	-6.401,	7.270
2,	-6.401,	15.370
3,	-2.201,	7.270
4,	-2.201,	15.370
5,	1.999,	7.270
6,	1.999,	15.370
7,	6.199,	7.270
8,	6.199,	15.370
9,	10.399,	7.270
10,	10.399,	11.770
11,	10.399,	15.370
12,	14.599,	7.270
13,	14.599,	11.770
14,	14.599,	15.370
15,	18.799,	11.770
16,	18.799,	15.370
17,	22.999,	7.270
18,	22.999,	11.770
19,	22.999,	15.370
20,	28.699,	7.270
21,	28.699,	15.370

0

C---((AXIS(I),I=1,NAXIS)

1,	2,	1,	2,							
2,	2,	3,	4,							
3,	2,	5,	6,							
4,	2,	7,	8,							
5,	3,	9,	10,	11,						
6,	3,	12,	13,	14,						
7,	3,	17,	18,	19,						
8,	2,	20,	21,							
9,	8,	1,	3,	5,	7,	9,	12,	17,	20,	
10,	9,	2,	4,	6,	8,	11,	14,	16,	19,	21,
11,	4,	10,	13,	15,	18,					
12,	2,	15,	16,							

0

C---(CL(i),i=1,KCL)
1.000, 6.000, 0.240, 0.240,

C---(BE(i),i=1,KBE)
1.000, 6.000, 0.300, 0.750,

C---((HSLD(i,j),j=1,3),i=1,MLOD)
1.000, 5.300, 0.700,

C---QUE JEI DIAN

0

C=====C

C LAYER 1

C=====C

C---BHOU RWB BHC IC ICC IG
0.120, 20.0,0.015, 20.0, 20.0, 2

C---((AXIS(I),I=1,NAXIS)

1,	2,	1,	2,							
2,	2,	3,	4,							
3,	2,	5,	6,							
4,	2,	7,	8,							
5,	3,	9,	10,	11,						
6,	3,	12,	13,	14,						
7,	3,	17,	18,	19,						
8,	2,	20,	21,							
9,	8,	1,	3,	5,	7,	9,	12,	17,	20,	
10,	9,	2,	4,	6,	8,	11,	14,	16,	19,	21,
11,	4,	10,	13,	15,	18,					
12,	2,	15,	16,							

0

C--- ZHU ---

901,	1,	0.000,	0.000
905,	1,	0.000,	0.000
90708,	1,	0.000,	0.000
1001,	1,	0.000,	0.000
1005,	1,	0.000,	0.000
100809,	1,	0.000,	0.000

0

C--- LIANG ---

201,	1,	0.000
301,	1,	0.000
401,	1,	0.000

0

C--- QIANG ---

101,	0.240,	0.000
50102,	0.240,	0.000
60102,	0.240,	0.000
70102,	0.240,	0.000

801,	0.240,	0.000
90107,	0.240,	0.000
100108,	0.240,	0.000
110103,	0.240,	0.000
1201,	0.240,	0.000

0

C— DONG KOU —

0

C-----C

C—KZDJ	NV	IB	IY	INF	CC
2,	3,	7,	4.00,	0,	1.00

EOF

1 ,2 ,3 ,4 ,5 ,6 ,8 ,9 ,A ,C ,B ,7 ,

END

bf-l.dat

..... PKII.EXE
DATA: 6/23/1997

OUTPUT DATA

4 2 1 0 2 2 1 0 4 20 20 2 0 0
.90 1.00
0

OUTPUT DATA

(1) .00 -2.00 (2) .00 .00 (3) 8.10 -2.00 (4) 8.10 .00

OUTPUT DATA

(1) 1 2 (2) 3 4
(1) 2 4

OUTPUT DATA

(1) IIII (2) 3III

OUTPUT DATA

(1) 1.00 (2) 1.00

OUTPUT DATA

(1) .00 (2) .00 (3) .00 (4) .00

OUTPUT DATA

(1) 1.00 .30 .75 .00 .00 .00
(2) 1.00 -.50 .24 .00 .00 .00

OUTPUT DATA

(1) 2 (2) 2
(1) 1

IIQQ= 15
STIF COMPUTE
DEAD COMPUTE

JOINT LOAD: JR XM XN
0

COLUMN LOAD: JC KL P X KX
0

BEAM LOAD: NE LI KL P X P1 X1 KL
P X P1 X1
1 2 1 5.60 .00 6 22.30
2.10

..DEAD LOAD..

STIF COMPUTE
LIVE COMPUTE

JOINT LOAD: JR XM XN
0

COLUMN LOAD: JC KL P X KX
0

BEAM LOAD: NE LI KL P X P1 X1 KL
P X P1 X1
1 2 4 22.50 4.60 6 2.90
2.10

EART COMPUTE
COMBI COMPUTE

••COMBINATION AND REINFORCEMENT••

COLUMN 1 (B= .500, H= .240, Lx= 2.00, Ly= 2.00)

NO 1 As= 0. M= -.06 N= 107.50 NO 1 As= 0.
M= -.13 N= -107.50
GG= 300.

COLUMN 2 (B= .500, H= .240, Lx= 2.00, Ly= 2.00)

NO 1 As= 0. M= .06 N= 107.50 NO 1 As= 0.
M= .13 N= -107.50
GG= 300.

BEAM 1 (B= .300, H= .750, L= 8.10)

BOTTOM

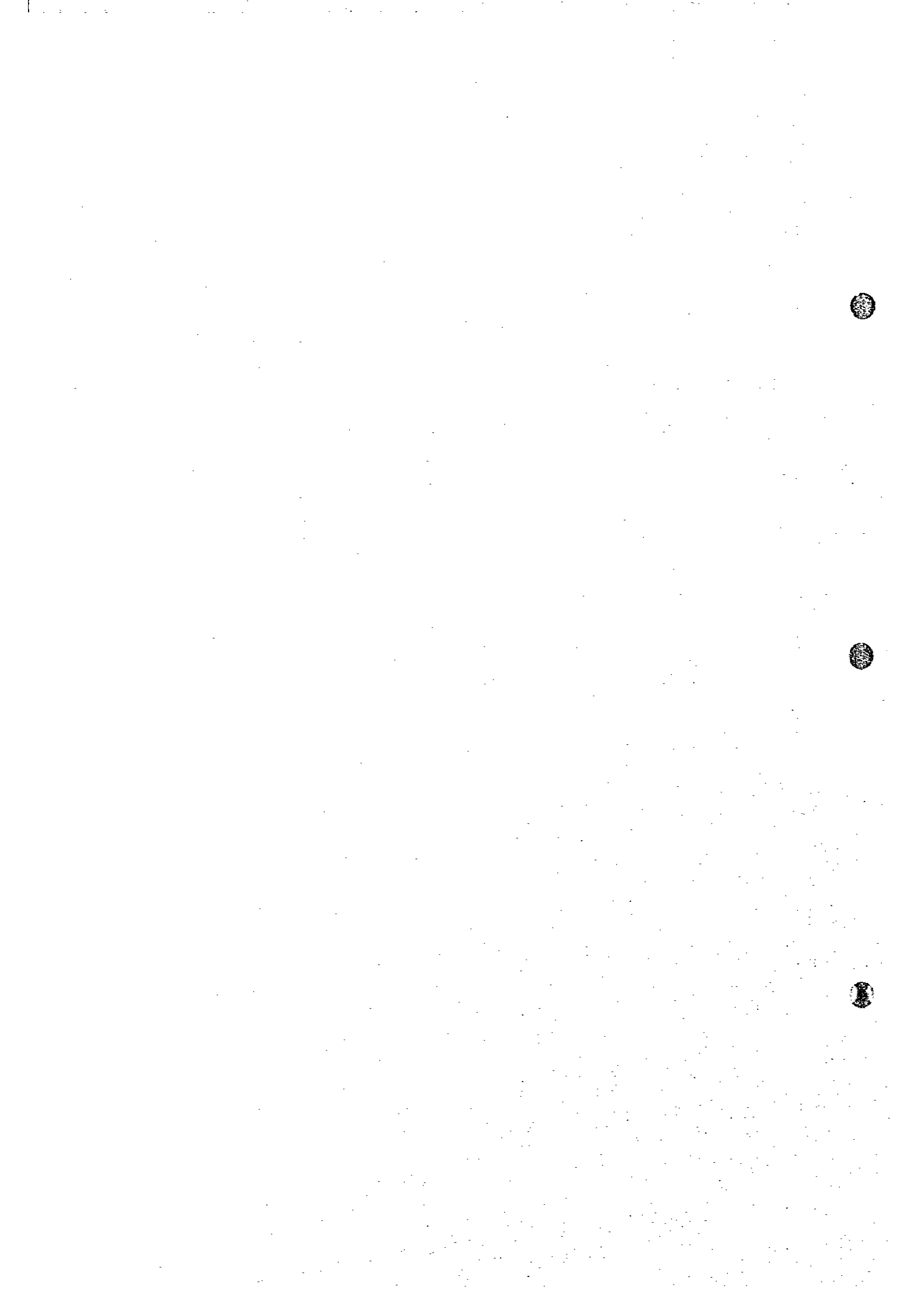
SECTION	1	2	3	4	5	6	7	8	9	
10	11	12	13							
M=	.00	-87.54	-167.65	-235.67	-287.61	-322.46	-340.20	-336.90	-299.16	-244.33
-173.42	-90.42	.00								
As(1)=	563.	406.	798.	1150.	1432.	1629.	1732.	1713.	1497.	1196.
827.	420.	563.								
As(2)=	563.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	563.								

TOP

SECTION	1	2	3	4	5	6	7	8	9	
10	11	12	13							
M=	.15	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.15								
As(1)=	563.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	563.								
As(2)=	563.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	563.								

VI= 133.29 NO 1 Vr= 137.56 NO 3 Asv/s= .00 As(3)= 563. Umaxb
= .008 Umaxt= .002
PK1 COMPUTE END

・消防本所 空調負荷計算書



工程名称	SI	Project name: SI
建筑物所在地区代码	09.2	Area code of the building: 09.2
建筑物名称	XFX	Building name: XFX
建筑物总层数	2	Total storeys: 2
室外采暖计算温度 °C	-2.0	Calculated temperature of outdoor heating °C: -2.0
建筑物总负荷 W(kcal/h)	232717.5	(200137.1) Total load of the building W(kcal/h):
建筑物热指标 W/m ² (kcal/(h·m ²))	69.5	(59.7) Target heat of the building W/m ² (kcal/(h·m ²))

各房间设计负荷 Design load of the room

Room Number 房间编号	Design Indoor Temperature °C 设计室内温度 °C	Design Heating Load W(kcal/h) 设计采暖负荷 W(kcal/h)
101	16.0	2477.5 (2130.6)
西北外墙 Northwest Exterior Wall		762.2 (655.5)
西北外窗 Northwest Exterior Window		164.3 (141.3)
地面 Floor		145.5 (125.1)
邻室 Adjacent Room		857.8 (737.7)
邻室 Adjacent Room		547.6 (471.0)
102	16.0	1059.9 (911.5)
西北外墙 Northwest		469.1 (403.4)
西北外窗		164.3 (141.3)
地面		89.5 (77.0)
邻室		337.0 (289.8)
103	16.0	6018.0 (5175.5)
西北外墙		1876.3 (1613.6)
西北外窗		328.5 (282.5)
西北外门 Northwest Exterior door		1860.8 (1600.3)
邻室		1348.0 (1159.3)
地面		604.3 (519.7)
104	25.0	4391.8 (3777.0)
西北外墙		1407.2 (1210.2)
西北外窗		492.8 (423.8)
地面		335.7 (288.7)
邻室		930.6 (800.3)
邻室		1225.5 (1053.9)
105	22.0	4787.8 (4117.6)
西北外墙		1250.9 (1075.7)
西北外窗		438.0 (376.7)
地面		402.9 (346.5)
邻室		1041.7 (895.8)
邻室		1654.4 (1422.8)
106	16.0	2119.7 (1823.0)
西北外墙		938.1 (806.8)
西北外窗		328.5 (282.5)
地面		179.1 (154.0)
邻室		674.0 (579.7)
107	16.0	2660.4 (2287.9)
西北外墙		938.1 (806.8)
西北外门		930.4 (800.2)
地面		179.1 (154.0)
邻室		612.7 (527.0)

108	16.0	1734.1 (1491.3)
西北外墙		762.2 (655.5)
西北外窗		328.5 (282.5)
地面		145.5 (125.1)
邻室		497.9 (428.2)
109	16.0	1703.3 (1464.8)
西北外墙		469.1 (403.4)
西北外窗		164.3 (141.3)
地面		89.5 (77.0)
邻室		306.4 (263.5)
邻室		674.0 (579.7)
110	16.0	2487.4 (2139.2)
西北外墙		938.1 (806.8)
西北外窗		328.5 (282.5)
地面		179.1 (154.0)
邻室		674.0 (579.7)
邻室		367.6 (316.2)
111	16.0	2181.0 (1875.7)
西北外墙		938.1 (806.8)
西北外窗		328.5 (282.5)
地面		179.1 (154.0)
邻室		367.6 (316.2)
邻室		367.6 (316.2)
112	10.0	963.8 (828.9)
西北外墙		625.4 (537.9)
西北外窗		219.0 (188.3)
地面		119.4 (102.7)
113	18.0	3383.3 (2909.7)
西北外墙		1042.4 (896.4)
西北外窗		365.0 (313.9)
地面		199.0 (171.1)
邻室		490.2 (421.6)
邻室		490.2 (421.6)
邻室		796.6 (685.1)
114	18.0	12341.6 (10613.7)
西北外墙		3192.3 (2745.4)
西北外窗		3444.8 (2962.5)
西南外墙	<i>Southwest exterior wall</i>	938.1 (806.8)
西南外门	<i>Southwest exterior door</i>	1244.0 (1069.8)
地面		994.8 (855.5)
邻室		1914.8 (1646.8)
邻室		612.7 (527.0)
115	18.0	4207.5 (3618.5)
西北外墙		1303.0 (1120.6)
西北外窗		1476.3 (1269.6)
地面		248.7 (213.9)
邻室		796.6 (685.1)
邻室		383.0 (329.4)
116	18.0	4413.7 (3795.8)

西北外墙		912.1 (784.4)
西北外窗		984.2 (846.4)
东北外墙 <i>Northeast exterior wall</i>		716.6 (616.3)
东北外窗 <i>Northeast exterior window</i>		167.5 (144.1)
地面		124.3 (106.9)
邻室		896.1 (770.7)
邻室		612.7 (527.0)
117	10.0	24316.7 (20912.4) ✓
东北外墙		2382.5 (2048.9)
东南外墙 <i>Southeast exterior wall</i>		2814.4 (2420.4)
东北外门 <i>Northeast exterior door</i>		355.3 (305.6)
东北外窗 <i>Northeast exterior window</i>		92.2 (79.3)
东南外门 <i>Southeast exterior door</i>		15425.6 (13266.1)
地面		2824.5 (2429.0)
西南外墙 <i>Southwest exterior wall</i>		422.2 (363.1)
118	10.0	36453.3 (31349.8) ✓
东南外墙		4784.5 (4114.7)
东南外门		28915.7 (24867.5)
地面		2753.0 (2367.6)
119	18.0	1836.9 (1579.8)
东南外墙		886.0 (762.0)
东南外窗		346.3 (297.8)
地面		286.0 (246.0)
邻室		318.6 (274.0)
120	10.0	2002.2 (1721.9)
东南外墙		1063.2 (914.4)
东南外窗		207.8 (178.7)
东南外窗		142.9 (122.9)
地面		343.2 (295.1)
邻室		245.1 (210.8)
121	18.0	6437.8 (5536.5)
东南外墙		2215.1 (1905.0)
东南外窗		692.5 (595.6)
东南外窗		119.1 (102.4)
地面		715.0 (614.9)
邻室		1991.4 (1712.6)
邻室		704.7 (606.0)
122	18.0	3062.1 (2633.4)
东南外墙		1407.2 (1210.2)
西南外墙		703.6 (605.1)
东南外窗		346.3 (297.8)
东南外窗		119.1 (102.4)
西南外窗		262.0 (225.3)
地面		223.8 (192.5)
123	18.0	2024.2 (1740.8)
西南外墙		645.0 (554.7)
西南外窗		262.0 (225.3)
地面		136.8 (117.6)
邻室		980.4 (843.1)
201	16.0	2614.5 (2248.4)

西北外墙	<i>Northwest exterior wall</i>	732.0 (629.5)
西北外窗	<i>----- window</i>	433.6 (372.9)
西北外窗	<i>----- window</i>	152.8 (131.4)
屋顶	<i>roof</i>	479.3 (412.2)
邻室		224.7 (193.2)
邻室		592.1 (509.2)
202	18.0	1787.7 (1537.4)
西北外墙		619.7 (532.9)
西北外窗		268.6 (231.0)
西北外门		575.3 (494.8)
屋顶		324.2 (278.8)
203	18.0	635.3 (546.4)
屋顶	<i>roof</i>	335.8 (288.7)
邻室	<i>adjacent room</i>	299.6 (257.6)
204	18.0	1787.7 (1537.4)
西北外墙		619.7 (532.9)
西北外窗		268.6 (231.0)
西北外门		575.3 (494.8)
屋顶		324.2 (278.8)
205	18.0	635.3 (546.4)
屋顶		335.8 (288.7)
邻室		299.6 (257.6)
206	18.0	1787.7 (1537.4)
西北外墙		619.7 (532.9)
西北外窗		268.6 (231.0)
西北外门		575.3 (494.8)
屋顶		324.2 (278.8)
207	18.0	635.3 (546.4)
屋顶		335.8 (288.7)
邻室		299.6 (257.6)
208	18.0	1787.7 (1537.4)
西北外墙		619.7 (532.9)
西北外窗		268.6 (231.0)
西北外门		575.3 (494.8)
屋顶		324.2 (278.8)
209	18.0	635.3 (546.4)
屋顶		335.8 (288.7)
邻室		299.6 (257.6)
210	18.0	1787.7 (1537.4)
西北外墙		619.7 (532.9)
西北外窗		268.6 (231.0)
西北外门		575.3 (494.8)
屋顶		324.2 (278.8)
211	18.0	635.3 (546.4)
屋顶		335.8 (288.7)

邻室		299.6 (257.6)
212	16.0	1695.2 (1457.9)
西北外墙	<i>Northwest exterior wall</i>	557.7 (479.6)
西北外窗	<i>Window</i>	433.6 (372.9)
屋顶	<i>roof</i>	479.3 (412.2)
邻室	<i>adjacent room</i>	224.7 (193.2)
213	16.0	1458.7 (1254.5)
西北外墙		453.1 (389.7)
西北外窗		433.6 (372.9)
屋顶		389.4 (334.9)
邻室		182.5 (157.0)
214	16.0	1008.3 (867.2)
西北外墙		278.8 (239.8)
西北外窗		152.8 (131.4)
屋顶		239.7 (206.1)
邻室		112.3 (96.6)
邻室		224.7 (193.2)
215	18.0	4052.3 (3485.0)
西北外墙		619.7 (532.9)
西北外窗		481.7 (414.3)
屋顶		659.9 (567.5)
邻室		811.3 (697.7)
邻室		299.6 (257.6)
邻室		1180.1 (1014.9)
216	18.0	3241.0 (2787.2)
西北外墙		619.7 (532.9)
西北外窗		481.7 (414.3)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		1180.1 (1014.9)
217	18.0	2360.4 (2030.0)
西北外墙		619.7 (532.9)
西北外窗		481.7 (414.3)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		299.6 (257.6)
218	18.0	2360.4 (2030.0)
西北外墙		619.7 (532.9)
西北外窗		481.7 (414.3)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		299.6 (257.6)
219	18.0	2360.4 (2030.0)
西北外墙		619.7 (532.9)
西北外窗		481.7 (414.3)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		299.6 (257.6)
220	18.0	2360.4 (2030.0)

西北外墙	<i>Northwest exterior wall window</i>	619.7 (532.9)
西北外窗		481.7 (414.3)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		299.6 (257.6)
221	18.0	3590.4 (3087.7)
西北外墙		774.6 (666.1)
西北外窗		481.7 (414.3)
屋顶		824.9 (709.4)
邻室		374.5 (322.0)
邻室		1134.7 (975.9)
222	18.0	3590.4 (3087.7)
西北外墙		774.6 (666.1)
西北外窗		481.7 (414.3)
屋顶		824.9 (709.4)
邻室		374.5 (322.0)
邻室		1134.7 (975.9)
223	18.0	4021.0 (3458.1)
西北外墙		774.6 (666.1)
屋顶		824.9 (709.4)
西北外窗		481.7 (414.3)
邻室		374.5 (322.0)
邻室		430.6 (370.3)
邻室	1134.7 (975.9)	
224	10.0	802.9 (690.5)
西北外墙		209.1 (179.9)
西北外窗		101.9 (87.6)
屋顶		222.7 (191.5)
邻室		269.1 (231.5)
225	10.0	3010.2 (2588.7)
东南外墙	<i>Southeast exterior wall window</i>	836.5 (719.4)
东南外窗		404.9 (348.2)
屋顶	<i>roof</i>	989.9 (851.3)
东北外墙	<i>Northeast exterior wall window</i>	587.9 (505.6)
东北外窗		190.9 (164.2)
邻室	<i>adjacent room</i>	0.0 (0.0)
226	18.0	3408.8 (2931.5)
东南外墙		658.4 (566.2)
东南外窗		337.4 (290.2)
屋顶		824.9 (709.4)
邻室		430.6 (370.3)
邻室		374.5 (322.0)
邻室	783.0 (673.3)	
227	18.0	2978.1 (2561.2)
东南外墙		658.4 (566.2)
东南外窗		337.4 (290.2)
屋顶		824.9 (709.4)
邻室		374.5 (322.0)
邻室		783.0 (673.3)
228	18.0	2450.0 (2107.0)

东南外墙	<i>Southeast exterior wall</i>	526.7 (453.0)
东南外窗		337.4 (290.2)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		626.4 (538.7)
229	18.0	2450.0 (2107.0)
东南外墙		526.7 (453.0)
东南外窗		337.4 (290.2)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		626.4 (538.7)
230	18.0	2450.0 (2107.0)
东南外墙		526.7 (453.0)
东南外窗		337.4 (290.2)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		626.4 (538.7)
231	18.0	2450.0 (2107.0)
东南外墙		526.7 (453.0)
东南外窗		337.4 (290.2)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		626.4 (538.7)
232	18.0	2450.0 (2107.0)
东南外墙		526.7 (453.0)
东南外窗		337.4 (290.2)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		626.4 (538.7)
233	18.0	2450.0 (2107.0)
东南外墙		526.7 (453.0)
东南外窗		337.4 (290.2)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		626.4 (538.7)
234	18.0	2450.0 (2107.0)
东南外墙		526.7 (453.0)
东南外窗		337.4 (290.2)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		626.4 (538.7)
235	18.0	2450.0 (2107.0)
东南外墙		526.7 (453.0)
东南外窗		337.4 (290.2)
屋顶		659.9 (567.5)
邻室		299.6 (257.6)
邻室		626.4 (538.7)
236	18.0	2450.0 (2107.0)
东南外墙		526.7 (453.0)

东南外墙 屋顶 邻室 邻室	<i>Southeast exterior window roof adjacent room</i>	337.4 (290.2) 659.9 (567.5) 299.6 (257.6) 626.4 (538.7)
237	18.0	1823.6 (1568.3)
东南外墙 东南外墙 屋顶 邻室		526.7 (453.0) 337.4 (290.2) 659.9 (567.5) 299.6 (257.6)
238	18.0	1204.6 (1035.9)
屋顶 邻室 邻室		659.9 (567.5) 299.6 (257.6) 245.1 (210.8)
239	18.0	2244.5 (1930.3)
东南外墙 东南外墙 东南外门 屋顶 邻室		526.7 (453.0) 170.9 (147.0) 505.7 (434.9) 659.9 (567.5) 381.3 (327.9)
240	18.0	1204.6 (1035.9)
屋顶 邻室 邻室		659.9 (567.5) 299.6 (257.6) 245.1 (210.8)
241	18.0	2244.5 (1930.3)
东南外墙 东南外墙 东南外门 屋顶 邻室		526.7 (453.0) 170.9 (147.0) 505.7 (434.9) 659.9 (567.5) 381.3 (327.9)
242	18.0	959.5 (825.2)
屋顶 邻室		659.9 (567.5) 299.6 (257.6)
243	18.0	1863.2 (1602.4)
东南外墙 东南外墙 东南外门 屋顶		526.7 (453.0) 170.9 (147.0) 505.7 (434.9) 659.9 (567.5)
244	18.0	959.5 (825.2)
屋顶 邻室		659.9 (567.5) 299.6 (257.6)
245	18.0	1863.2 (1602.4)
东南外墙 东南外墙 东南外门 屋顶		526.7 (453.0) 170.9 (147.0) 505.7 (434.9) 659.9 (567.5)
246	18.0	959.5 (825.2)

屋顶	roof	659.9	(567.5)
邻室	adjacent room	299.6	(257.6)
247	18.0	1863.2	(1602.4)
东南外墙	southeast exterior wall	526.7	(453.0)
东南外窗	— window	170.9	(147.0)
东南外门	— door	505.7	(434.9)
屋顶	roof	659.9	(567.5)
248	18.0	3384.8	(2910.9)
东南外墙	—	557.7	(479.6)
东南外窗	—	573.8	(493.4)
西南外墙	southwest exterior wall	801.7	(689.5)
西南外窗	— window	367.1	(315.7)
西南外窗	— window	125.1	(107.6)
屋顶	roof	659.9	(567.5)
邻室	adjacent room	299.6	(257.6)

Tubular Statement for Heating

〈右向最近立管环路〉

共4页第1页

No. pipe section	heat load	flow rate	pipe Dia	specific friction resistance	airflow speed	pipe length	eguralent length	reduction length	total resistance
	w	kg/h	mm	pa/m	m/s	m	m	m	pa
1	39360	1350	32	68	0.38	1	3	4	272
立1	2880	95	15	29.75	0.14	3	8.05	11.05	328.7
立1'	2880	95	15	29.75	0.14	3.6	8.55	12.15	361.5
13	2880	95	20	6.65	0.08	7.6	0.5	8.1	53.9
14	5760	195	20	24.81	0.16	3	0.5	3.5	86.8
15	8640	290	20	52.26	0.23	10.3	0.5	10.8	564.4
16	11520	390	25	26.91	0.19	5	0.7	5.7	153.4
17	14400	490	25	41.42	0.24	3.5	0.7	4.2	174
18	17280	600	25	60.89	0.30	10	1.7	11.7	712.4
19	20160	700	25	81.79	0.35	0.5	0.7	1.2	98.1
20	24000	820	25	110.89	0.40	6	1.7	7.7	853.9
21	27840	1000	32	38.20	0.28	6	1	7	267.4
22	31680	1100	32	45.83	0.31	6	1	7	320.8
23	35520	1225	32	56.60	0.35	11.3	1	12.3	696.2
24	39360	1350	32	68.00	0.38	10	8	18	1224
total									6167.5
total supply	69120	2400	50	27.07	0.31	11	3.6	14.6	395.2
total return	69120	2400	50	27.07	0.31	11	3.6	14.6	395.2
total resistance									6958

No. pipe section	heat load	flow rate	pipe Dia	specific friction resistance	airflow speed	pipe length	eguralent length	reduction length	total resistance
	w	kg/h	mm	pa/m	m/s	m	m	m	pa
1	39360	1350	32	68		1	3	4	272
2	36480	1250	32	58.64	0.355	7.6	1	8.6	504.3
3	33600	1150	32	50	0.325	3	1	4	200
4	30720	1050	32	42	0.295	10.3	1	11.3	474.6
5	27840	950	32	35	0.265	5	1	6	210
6	24960	860	32	28.67	0.24	3.5	1	4.5	129
7	22080	760	32	22.70	0.215	10	2.5	12.5	283.8
8	19200	660	25	73.07	0.33	3.3	0.7	4	292.3
9	15360	520	25	46.36	0.26	6	1.7	7.7	357
10	11520	390	25	26.91	0.19	6	0.7	6.7	180.3
11	7680	270	20	45.66	0.22	6	0.5	6.5	296.8
12	3840	135	20	12.58	0.11	11.3	0.5	11.8	148.4
∅12	3840	135	15	57.27	0.20	3.5	8.35	11.85	678.6
∅12'	3840	135	15	57.27	0.20	5.4	9.6	15	859.1
24	39360	1350	32	68	0.38	10	8	18	1224
total									6110.2

No. pipe section	heat load	flow rate	pipe Dia	specific friction resistance	airflow speed	pipe length	eguralent length	reduction length	total resistance
	w	kg/h	mm	pa/m	m/s	m	m	m	pa
25	29760	1000	32	38.20	0.28	1	6.5	7.5	286.5
±20	2880	95	15	29.75	0.14	1	8.05	9.05	269.2
±20'	2880	95	15	29.75	0.14	3	8.55	11.55	343.6
33	2880	95	20	6.65	0.08	9.6	0.5	10.1	67.2
34	8640	290	20	52.26	0.23	11.6	0.5	12.1	632.3
35	11520	390	20	91.81	0.31	9.3	1.5	10.8	991.5
36	14400	490	20	142.27	0.39	0.5	0.5	1	142.3
37	18240	640	25	68.89	0.32	9.6	1.7	11.3	778.5
38	22080	760	25	96	0.375	9.6	0.7	10.3	988.8
39	25920	900	25	132.72	0.44	9.6	0.7	10.3	1367
40	29760	1000	32	38.20	0.28	1	3.5	4.5	171.9
total									6038.8

No. pipe section	heat load	flow rate	pipe Dia	specific friction resistance	airflow speed	pipe length	eguralent length	reduction length	total resistance
	w	kg/h	mm	pa/m	m/s	m	m	m	pa
25	29760	1000	32	38.20	0.28	1	6.5	7.5	286.5
26	26880	900	32	31.25	0.25	7.6	1	8.6	268.8
27	21120	740	25	91.01	0.37	12.6	0.7	13.3	1210.4
28	18240	640	25	68.89	0.32	9.3	1.7	11	757.8
29	15360	520	25	46.36	0.26	3.3	0.7	4	185.4
30	11520	390	20	91.81	0.31	9.6	2	11.6	1065
31	7680	270	20	45.66	0.22	9.6	0.5	10.1	461.2
32	3840	135	20	12.58	0.11	9.6	0.5	10.1	127.1
立13	3840	135	15	57.27	0.20	3.5	8.35	11.85	678.7
立13'	3840	135	15	57.27	0.20	5.4	9.6	15	859.1
40	29760	1000	32	38.20	0.28	1	3.5	4.5	171.9
total									6071.9

Tubular Statement for Air-condition

< K-4 系统一层最近环路 >

共 11 页 第 1 页

No. pipe section	flow rate	pipe Dia	airflow speed	specific friction resistance	pipe length	local resistance factor	local resistance	friction resistance	total resistance
	kg/h	mm	m/s	pa/m	m		pa	pa	pa
1	2.768	50	12	300	10.3	7.9	5688	3090	8778
支1	0.162	15	0.75	600	2.5	7.6	2147	1500	3647
支2	0.162	15	0.75	600	2.5	7.6	2147	1500	3647
9	0.162	20	0.4	180	3	0.1	12.5	540	552.5
10	0.324	20	0.8	550	4.6	0.1	32	2530	2562
11	0.725	25	1.2	750	2	0.1	72	1500	1572
12	1.126	32	1.1	450	4.5	0.1	60.5	2025	2085.5
13	1.928	40	1.3	500	4.8	0.1	84.5	2400	2484.5
14	2.138	40	1.5	650	4.8	0.1	112.5	3120	3232.5
15	2.558	40	1.7	850	4.8	0.1	144.5	4080	4224.5
16	2.768	50	1.2	300	39.5	8.5	6120	11850	17970
sub total									50755.5
fan coil									8500
total									59255.5

< K-1 系统一层最远环路 >

No. pipe section	flow rate	pipe Dia	airflow speed	specific friction resistance	pipe length	local resistance factor	local resistance	friction resistance	total resistance
	kg/h	mm	m/s	pa/m	m		pa	pa	pa
1	2.768	50	1.2	300	10.3	7.9	5688	3090	8778
2	2.606	50	1.1	280	3	0.1	60.5	840	900.5
3	2.444	50	1.0	250	4.6	0.1	50	1150	1200
4	2.043	40	1.4	600	2	0.1	98	1200	1298
5	1.642	40	1.0	330	4.5	0.1	50	1485	1535
6	0.84	32	0.8	290	4.8	0.1	32	1392	1424
7	0.63	25	1.1	600	4.8	0.1	60.5	2880	2940.5
8	0.21	20	0.65	300	4.8	0.1	21.3	1440	1461.3
支19	0.21	15	0.95	950	2.5	6.7	3031.8	2375	5406.8
支20	0.21	15	0.95	950	2.5	7.9	3574.8	2375	5949.8
16	2.768	50	1.2	300	39.5	8.5	6120	11850	17970
sub total									48863.9
fan coil									17000
total									65863.9

No. pipe section	flow rate	pipe Dia	airflow speed	specific friction resistance	pipe length	local resistance factor	local resistance	friction resistance	total resistance
	kg/h	mm	m/s	pa/m	m		pa	pa	pa
1	2.8	50	1.3	300	13.7	0.7	591.5	4110	4701.5
支1	0.21	15	0.95	950	2	8	3620	1900	5520
支2	0.21	15	0.95	950	2	8.2	3710.5	1900	5610.5
9	0.21	20	0.65	300	2.6	0.1	21.3	780	801.3
10	0.49	25	0.9	400	2	0.1	40.5	800	840.5
11	0.70	25	1.2	700	4.8	0.1	72	3360	3432
12	1.12	32	1.1	430	4.8	0.1	60.5	2064	2124.5
13	1.54	32	1.4	700	4.8	0.1	98	3360	3458
14	1.96	40	1.3	500	4.8	0.1	84.5	2400	2484.5
15	2.38	40	1.6	750	4.8	0.1	128	3600	3728
16	2.80	50	1.3	300	42.8	1.4	1183	12840	14023
sub total									46723.8
fan coil									17000
total									63723.8

<K子 系统二层搬运环路>

共11页 第4页

No. pipe section	flow rate	pipe Dia	airflow speed	specific friction resistance	pipe length	local resistance factor	local resistance	friction resistance	total resistance
	kg/h	mm	m/s	pa/m	m		pa	pa	pa
1	2.80	50	1.3	300	13.7	0.7	591.5	4110	4701.5
2	2.59	50	1.2	280	2.6	0.1	72	728	800
3	2.31	50	0.9	220	2	0.1	40.5	440	480.5
4	2.10	40	1.49	650	4.8	0.1	112.5	3120	3232.5
5	1.68	40	1.10	360	4.8	0.1	60.5	1728	1788.5
6	1.26	32	1.3	600	4.8	0.1	84.5	2880	2964.5
7	0.84	32	0.80	300	4.8	0.1	32	1440	1472
8	0.42	20	1.2	860	4.8	0.1	72	4128	4200
支13	0.21	15	0.95	950	2	8	3620	1900	5520
支14	0.21	15	0.95	950	2	8.2	3710.5	1900	5610.5
16	2.80	50	1.3	300	42.8	1.4	1183	12840	14023
sub total									44793
fan coil									17000
total									61793

< K-1 系统二层中间环路 >

共11页 第5页

No. pipe section	flow rate	pipe Dia	airflow speed	specific friction resistance	pipe length	local resistance factor	local resistance	friction resistance	total resistance
	kg/h	mm	m/s	pa/m	m		pa	pa	pa
1	2.80	50	1.3	300	13.7	0.7	591.5	4110	4701.5
2	2.59	50	1.2	280	2.6	0.1	72	728	800
支3	0.28	25	0.4	120	2	8	1000	240	1240
支4	0.28	25	0.4	120	2	8.2	1025	240	1265
10	0.49	25	0.9	400	2	0.1	40.5	800	840.5
11	0.70	25	1.2	700	4.8	0.1	72	3360	3432
12	1.12	32	1.1	430	4.8	0.1	60.5	2064	2124.5
13	1.54	32	1.4	700	4.8	0.1	98	3360	3458
14	1.96	40	1.3	500	4.8	0.1	84.5	2400	2484.5
15	2.38	40	1.6	750	4.8	0.1	128	3600	3728
16	2.80	50	1.3	300	42.8	1.4	1183	12840	14023
sub total									38097
fan coil									33500
total									71597
total supply	5.568	65	1.4	310	7.5	6.4	6272	2325	8597
total return	5.568	65	1.4	310	7.5	6.4	6272	2325	8597
total resistance									88791

No. pipe section	flow rate	pipe Dia	airflow speed	specific friction resistance	pipe length	local resistance factor	local resistance	friction resistance	total resistance
	kg/h	mm	m/s	pa/m	m		pa	pa	pa
1	2.857	50	1.2	400	7.8	7.9	5688	3120	8808
支1	0.162	15	0.75	600	1	8	2260	600	2860
支2	0.162	15	0.75	600	1	8.2	2260	600	2860
11	0.162	20	0.45	170	4.8	0.1	12.5	816	828.5
12	0.324	20	0.85	550	4.8	0.1	36	2640	2676
13	0.486	25	0.80	350	5.7	0.1	32	1995	2027
14	0.938	32	0.90	350	6	0.1	40.5	2100	2140.5
15	1.39	32	1.3	600	10.9	0.4	338	6540	6878
16	1.552	40	1.0	350	4.8	0.1	50	1680	1730
17	1.953	40	1.3	500	2.5	0.4	84.5	1250	1334.5
18	2.405	50	1.0	250	6	0.1	50	1500	1550
sub total	2.857	50	1.2	400	25.9	2.8	2016	10360	12376
fan coil									46069
total									8500
									54569

No. pipe section	flow rate kg/h	pipe Dia mm	airflow speed m/s	specific friction resistance pa/m	pipe length m	local resistance factor	local resistance pa	friction resistance pa	total resistance pa
1	2.857	50	1.2	400	7.8	7.9	5688	3120	8808
2	2.695	50	1.1	380	4.8	0.1	60.5	1824	1884.5
3	2.533	50	1.05	260	4.8	0.1	55	1248	1303
4	2.371	50	1.0	250	5.7	0.1	50	1425	1475
5	1.919	40	1.3	500	6	0.1	84.5	3000	3084.5
6	1.467	40	0.9	300	10.9	0.4	40.5	3270	3310.5
7	1.305	40	0.8	240	4.8	0.1	32	1152	1184
8	0.904	32	0.8	300	2.5	0.4	128	750	878
9	0.452	25	0.8	340	6	0.1	32	2040	2072
支17	0.452	25	0.8	340	1	8	2560	340	2900
支18	0.452	25	0.8	340	1	8.2	2624	340	2964
10	2.857	50	1.2	400	25.9	2.8	2016	10360	12376
sub total									42239.5
fan coil									17500
total									59740
total supply	8.012	80	1.6	320	8	6.4	8192	2560	10752
total return	8.012	80	1.6	320	8	6.4	8192	2560	10752
total resistance									81244

No. pipe section	flow rate kg/h	pipe Dia mm	airflow speed m/s	specific friction resistance pa/m	pipe length m	local resistance factor	local resistance pa	friction resistance pa	total resistance pa
19	5.155	65	1.4	310	11.3	0.4	392	3503	3895
20	1.89	40	1.2	450	2.4	8.2	5904	1080	6984
支1	0.21	20	0.65	300	2	8	1700	600	2300
支2	0.21	20	0.65	300	2	8.2	1743	600	2343
28	0.42	25	0.75	300	4.8	0.1	28.3	1440	1468.3
29	0.84	32	0.85	300	4.8	0.1	36.3	1440	1476.3
30	1.26	32	1.2	500	4.8	0.1	72	2400	2472
31	1.47	40	1.0	300	4.8	0.1	50	1440	1490
32	1.68	40	1.1	380	4.8	0.1	60.5	1824	1884.5
26	1.89	50	0.8	160	27.4	10	3200	4384	7584
27	5.155	65	1.4	310	11.3	0.4	392	3503	3895
sub total									35792.1
fan coil									17000
total									52792

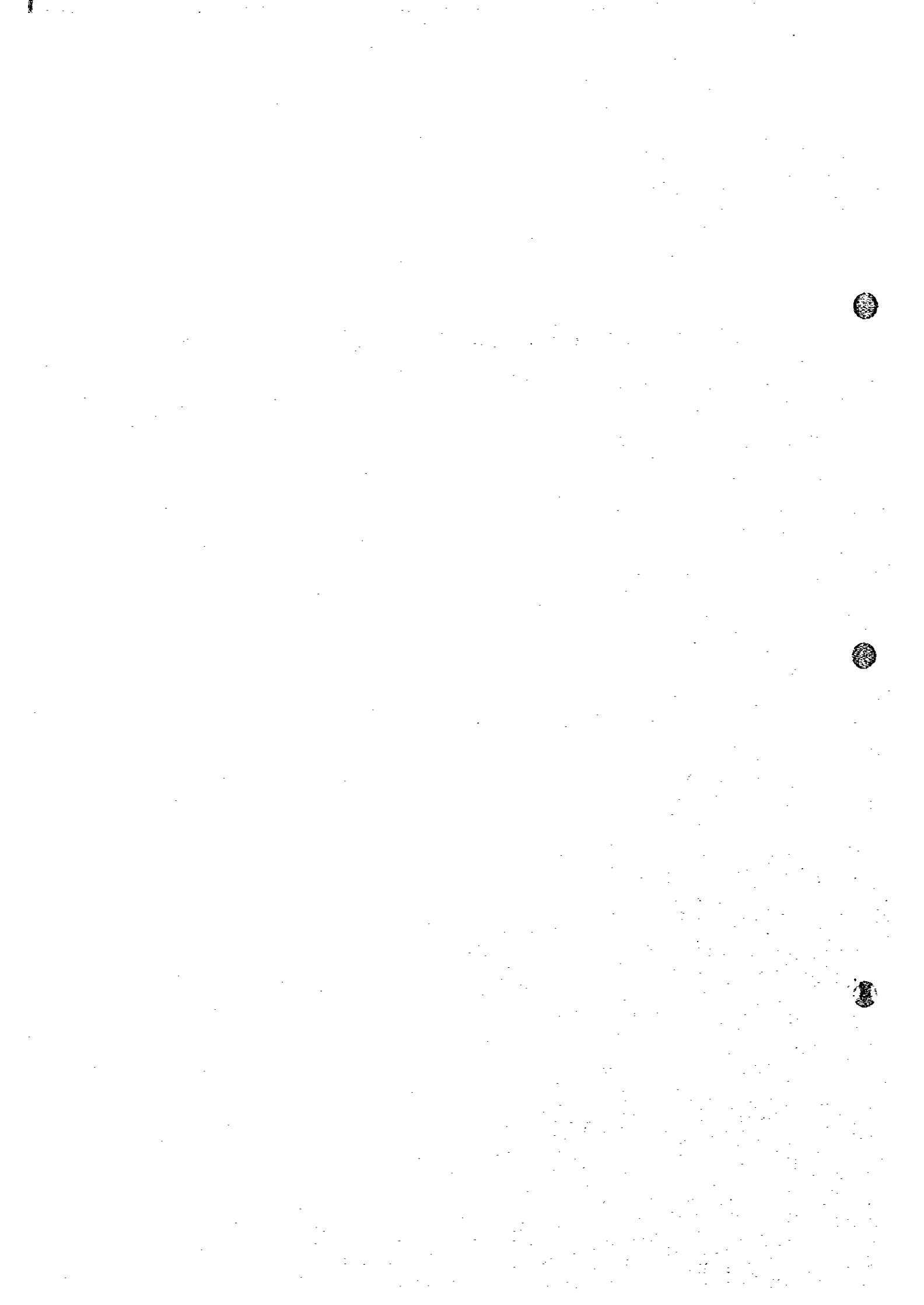
No. pipe section	flow rate kg/h	pipe Dia mm	airflow speed m/s	specific friction resistance pa/m	pipe length m	local resistance factor	local resistance pa	friction resistance pa	total resistance pa
19	5.155	65	1.4	310	11.3	0.4	392	3503	3895
20	1.89	40	1.2	450	2.4	8.2	5904	1080	6984
21	1.47	40	0.95	300	4.8	0.1	45	1440	1485
22	1.05	32	1.0	400	4.8	0.1	500	1920	2420
23	0.63	25	1.05	600	4.8	0.1	55	2880	2935
24	0.42	25	0.75	300	4.8	0.1	28.3	1440	1468.3
25	0.21	20	0.65	300	4.8	0.1	21.3	1440	1461.3
支17	0.21	20	0.65	300	2	8	1700	600	2300
支18	0.21	20	0.65	300	2	8.2	1743	600	2343
26	1.89	50	0.8	160	27.4	10	3200	4380	7584
27	5.155	65	1.4	310	11.3	0.4	392	3503	3895
sub total									36771
fan coil									17000
total									53771

< K-2 系统二层右向最近环路 >

No. pipe section	flow rate kg/h	pipe Dia mm	airflow speed m/s	specific friction resistance pa/m	pipe length m	local resistance factor	local resistance pa	friction resistance pa	total resistance pa
19	5.155	65	1.4	310	11.3	0.4	392	3503	3895
33	3.265	50	1.4	410	2	6.5	6370	820	7190
支19	0.21	20	0.65	300	2	8	1700	600	2300
支20	0.21	20	0.65	300	2	8.2	1743	600	2343
40	0.42	25	0.75	300	4.8	0.1	28	1440	1468
41	0.84	25	1.4	950	4.8	0.1	98	4560	4658
42	1.26	32	1.2	500	5.9	0.1	72	2950	3022
43	2.062	40	1.3	520	6	0.1	85	3120	3205
44	2.864	50	1.2	300	6	0.1	72	1800	1872
39	3.265	65	0.9	120	30	8.3	3362	3600	6962
27	5.155	65	1.4	310	11.3	0.4	392	3503	3895
sub total									40810
fan coil									17000
total									57810

No. pipe section	flow rate	pipe Dia	airflow speed	specific friction resistance	pipe length	local resistance factor	local resistance	friction resistance	total resistance
	kg/h	mm	m/s	pa/m	m		pa	pa	pa
19	5.155	65	1.4	310	11.3	0.4	392	3503	3895
33	3.265	50	1.4	410	2	6.5	6370	820	7190
34	2.845	50	1.2	300	4.8	0.1	72	1440	1512
35	2.425	40	1.6	750	4.8	0.1	128	3600	3728
36	2.005	40	1.3	520	5.9	0.1	85	3068	3153
37	1.203	32	1.1	500	6	0.1	61	3000	3061
38	0.401	25	0.7	290	6	0.1	25	1740	1765
支39	0.401	25	0.7	290	2	8	1960	580	2540
支40	0.401	25	0.7	290	2	8.2	2009	580	2589
39	3.265	65	0.9	120	30	8.3	3362	3600	6962
27	5.155	65	1.4	310	11.3	0.4	392	3503	3895
sub total									40290
fan coil									12000
total									52290

・ 消防本所 給排水配管口径計算書



Main Fire Station's Pipe Diameter Calculation of Water Supply and Sewerage

1. Calculating the Total Equivalence of the Calculated Pipe:
 Single facility's equivalence is determined by the following chart:

Name	Basin	Wash Sink	Shower	Closet	Urinal	Tap
Equivalence for Water Supply Pipe Calculating	0.5	1	0.75	0.5	0.25	0.8
Equivalence for Sewerage Pipe Calculating	0.3	1	0.45	6	0.15	0.5

2. Determine Pipe Diameter According To Total Equivalence

	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN75	DN80	DN100
Maximum Equivalence For Water Supply Pipe	1	2	3	6	9	32	92		190	
Maximum Equivalence For Vertical Sewerage Pipe						6		70		100
Maximum Equivalence For Horizontal Sewerage Pipe						4.5		12		36



・ 飛行区消火栓配管損失計算書



**Calculate of Hydraulic for Fire pump Light
and Fire Water Supply System in Flying Area**

No.	Design Parameter	Program No.1		Program No.2	
		Northern	Southern	Northern	Southern
1	Length of Pipe (DN150, Q=37.5/s) (→)	2.00	2.00	2.00	2.00
2	1000i (DN150)	58.80	58.80	58.80	58.80
3	Current Velocity (v/s)	2.15	2.15	2.15	2.15
4	DN150 Lose Here of Water (m)	Δ 0.12	0.12	0.12	0.12
5	Length of Pipe (DN250, Q=75/s)	20.00	20.00	20.00	20.00
6	1000i (DN250)	15.50	15.50	15.50	15.50
7	Current Velocity (v/s)	1.54	1.54	1.54	1.54
8	DN250 Lose Here of Water (m)	Δ 0.31	0.31	0.31	0.31
9	Length of Pipe (DN350, Q=150/s)	2,940.00	3,910.00	2,910.00	2,640.00
10	1000i (DN350)	10.20	10.20	10.20	10.20
11	Current Velocity (v/s)	1.56	1.56	1.56	1.56
12	DN350 Lose Here of Water (m)	Δ 29.99	39.88	29.68	26.93
13	Length of Pipe (DN400, Q=150/s)	1,300.00	330.00	830.00	910.00
14	1000i (DN400)	5.04	5.04	5.04	5.04
15	Current Velocity (v/s)	1.19	1.19	1.19	1.19
16	DN400 Lose Here of Water (m)	Δ 6.55	1.66	4.18	4.59
17	Total Lose Head of Water with Pipelines	41.40	47.01	38.41	35.78
18	Lose Head of Water in Pump Room	3.00	3.00	3.00	3.00
19	Design Light of Pump	54.40	60.01	61.41	48.78

Illustrate: Adopt Program No.2 .Pump light is H=51.4m



・ 飛行区消火栓電力負荷計算書



Shanghai Pudong International Airport Project(Airside Civil Works)

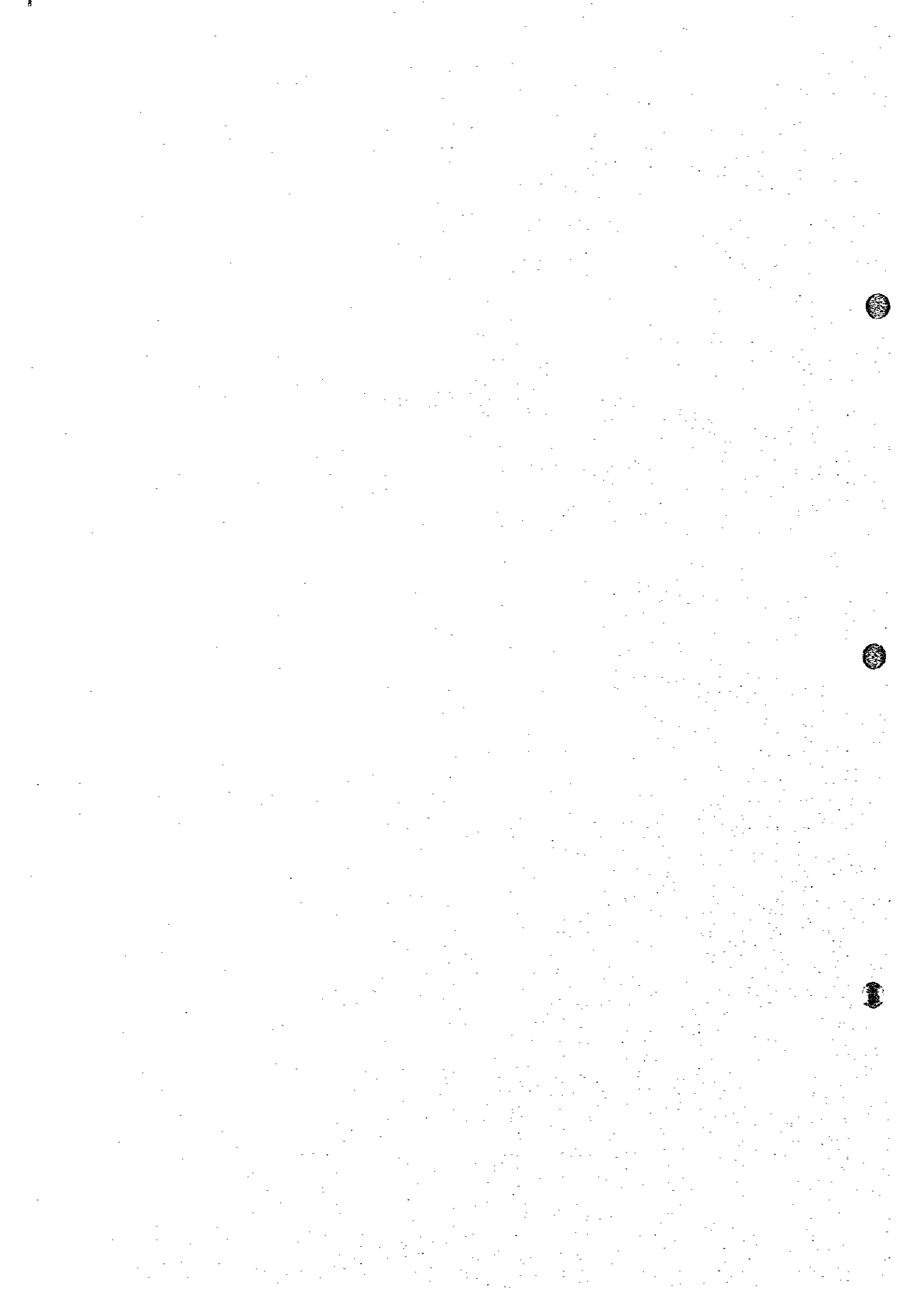
POWER CALCULATION OF FIRE PUMP STATION IN FLYING AREA

SER.NO	LOAD POWER CONSUMPTION OF EQUIPMENT	CAPACITY	POWER FACTOR COSφ	SIMULTANEOUS RATIO OF UTILIZATION	ACTIVE POWER	REACTIVE POWER
1	FIRE PUMP	3*75KW	0.8	0.67	150	112.5
2	OTHERS	100KW	0.9	1	100	48.43
TOTAL	S=297.3KVA				250	160.93

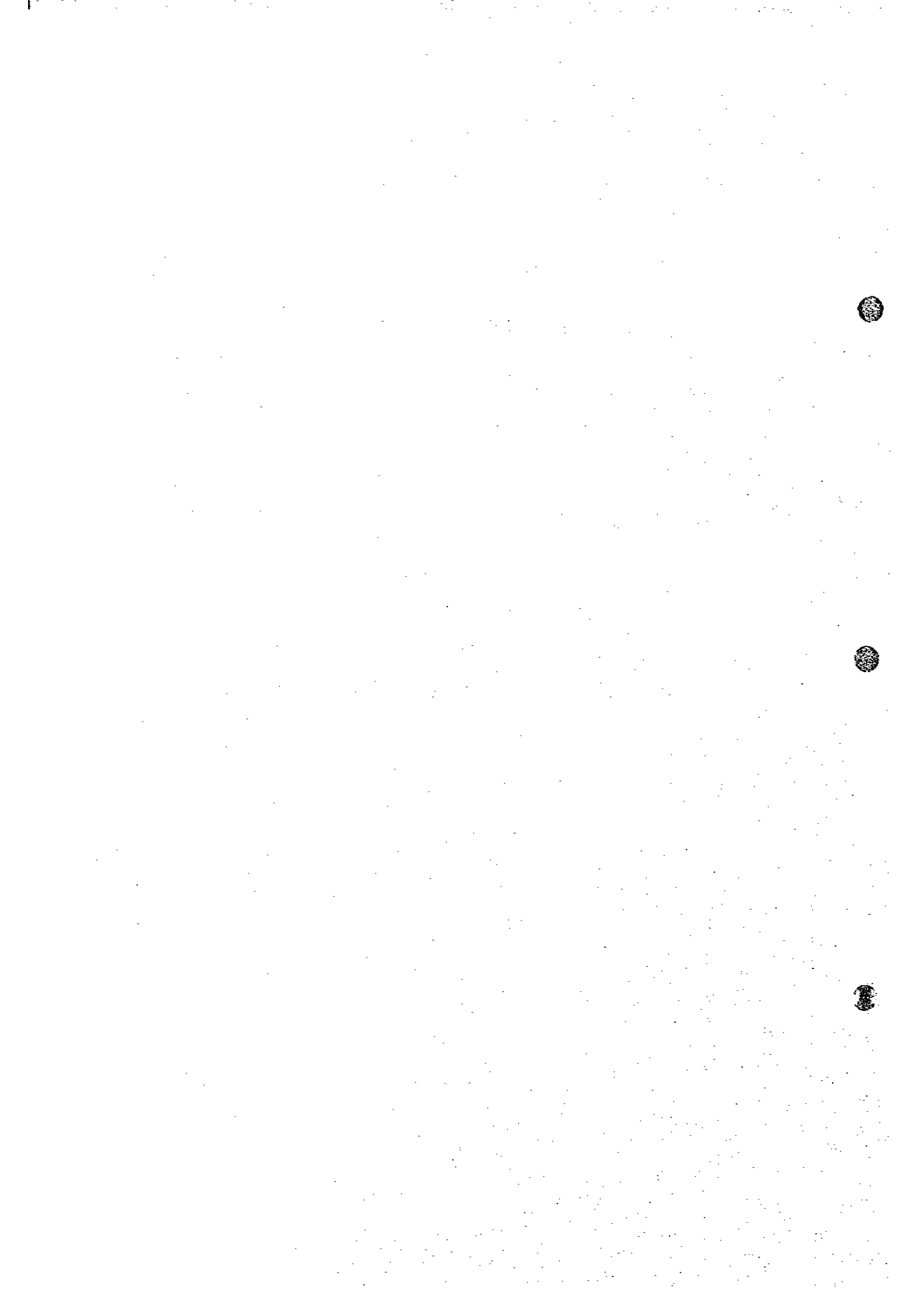
TRANSFORMER CAPACITY TO BE SELECTED WILL BE 400KVA



<工事費積算>



・ 消防本所 工事費積算



Estimated Total Quantity
Shanghai Pudong International Airport Project (Fire Fighting and Rescue Engineering)
Main Fire Station (Building Works)

序号	项目名称	计算表达式	金额
1	直接费(土建)	土石直接费+土建机械进出场费	2,029,542
2	零星费(土建)	(1) × 5%	101,427
3	其他直接费(土建)	((1)+(2)) × 3.5%	74,549
4	直接费小计	(1)+(2)+(3)	2,204,510
5	综合间接费(土建)	((1)+(2)+(3)) × 12%	264,542
6	费用合计(土建)	(1)+(2)+(3)+(5)	2,469,060
7	费用合计	(6)	2,469,060
8	利润	(6) × 9%	222,215
9	开办费	(4) × 3%	66,136
10	人工补差	人工日 × 2.4	50,218
11	施工流动津贴	人工日 × 2.5	52,310
12	主要材料差价	主材合同价-主材预算价	681,068
13	机械台班补差	机械96预算价-机械93预算价	50,243
14	次材差价	土建材料费 × 1.18% + 吊钩材料费 × 4.81% + 打桩材料费 × 17.25%	18,607
15	费用合计	(7)+(8)+(9)+(10)+(11)+(12)+(13)+(14)	3,609,857
16	其他费用	(4) × 0.5% + (15) × 3%	11,932
17	税金	((15)+(16)) × 3.41%	123,503
18	预留费	((15)+(16)+(17)) × 5%	187,265
19	总造价	(15)+(16)+(17)+(18)	3,932,557

Estimated Total Quantity

Shanghai Pudong International Airport Project(Fire Fighting and Rescue Engineering)
Main Fire Station(Building Works)

编号	名称	工程量	单位	单价	合价	人工数	材料费	主材差	备注
基础、打桩工程									
1041	钢筋混凝土基础埋深1.5m以内C20	526.8300	立方米	425.9400	224,398	3,452.53	160,319.64	130,731.49	
1166	钢筋混凝土梁现浇钢筋混凝土C20	90.6700	立方米	557.5500	50,553	469.52	42,798.21	25,440.03	
	小计				274,951	3,922.05	203,057.85	156,171.52	
柱梁工程									
2007	现浇钢筋混凝土(矩形)周长1.8m以内C20	124.1300	立方米	702.6200	87,216	996.27	71,347.44	41,496.78	
2020	现浇钢筋混凝土(矩形)C30	274.2200	立方米	615.8100	168,867	1,722.10	139,237.95	83,306.91	
2113	起3.6m每埋3m以内方柱	74.4800	立方米	18,7700	1,398	85.80	396.98	79.54	
2114	起3.6m每埋3m以内梁	164.5300	立方米	21,8500	3,595	163.87	1,684.79	492.67	
	小计				261,076	2,968.04	212,667.16	125,375.90	
墙身工程									
3038	框架内墙标准砖1砖	3,976.0000	平方米	41,3200	164,288	2,503.29	128,226.00	68,292.97	
3012	框架外墙标准砖1砖	211.3800	平方米	43,5200	9,199	207.41	6,438.63	3,898.50	
3117	铁皮水落管45cm	72.0000	延长米	14,3200	1,031	13.12	880.56	1,480.25	
3126	女儿墙碎块出水管管径100	8.0000	个	39,5200	316	2.62	286.48		
3147	预埋用长脚手架3.6m以上钢管	2,117.3300	平方米	1,1900	2,520	143.04	444.64	441.04	
3134	钢管双排外脚手架高12m内	1,750.3200	平方米	4,4500	7,789	152.10	5,566.02	2,149.04	
3152	钢管满堂脚手架高3.61-5.80m	3,871.9500	平方米	2,2200	8,596	482.83	2,942.68	1,125.96	
	小计				193,739	3,306.41	144,785.01	77,387.76	
楼、地、屋面工程									
4001	平整场地	2,086.5600	平方米	4,2900	8,951	320.50	5,258.13	3,489.56	
4002	室内回填土室内外高差45cm内	2,086.5600	平方米	1,8400	3,839	351.17			
4009	垫层现浇混凝土1cm厚	801.8400	平方米	0,8900	714	7.14	617.42	427.62	
4011	垫层砼(1cm厚)C15	1,693.2400	平方米	1,4800	2,506	21.17	2,235.08	1,586.23	
4098	块料面层同质地砖水泥砂浆结合层	2,165.8800	平方米	60,8500	131,794	859.64	120,228.00	126,868.80	
4020楼	地面防潮层防水涂料1毡2油	516.9600	平方米	6,8800	3,557	23.16	3,241.34	2,118.50	
4066	找平层细石砼3cm厚无筋	583.2000	平方米	6,1800	3,604	62.92	2,798.54	1,887.47	
4064	找平层水泥砂浆2cm厚	3,347.8800	平方米	3,6600	12,253	220.29	9,206.67	6,420.56	
4104	木板面层硬木条长条企口地板铺在水磨石上	321.7200	平方米	117,7300	37,876	284.92	34,166.66	4,250.63	
4082	整体面层细石砼有筋4cm厚	912.9600	平方米	13,4000	12,234	214.55	9,449.14	6,289.47	
4009	垫层现浇混凝土1cm厚	1,483.5600	平方米	0,8900	1,320	13.20	1,142.34	791.18	
4065	找平层水泥砂浆每增减0.5cm厚	1,483.5600	平方米	0,8900	1,320	20.92	1,023.66	717.45	

Estimated Total Quantity

Shanghai Pudong International Airport Project(Fire Fighting and Rescue Engineering)
Main Fire Station(Building Works)

编号	名称	工程数量	单位	单价	合价	人工数	材料费	主材差	备注
4070	地面防潮层沥青卷材二毡三油	66.2400	平米	10.1900	675	4.48	614.04	402.55	
4071	整体面层水泥砂浆压光面层2cm	199.5600	平米	6.2500	1,247	33.01	830.17	610.89	
4325	装饰龙骨天棚纸面石膏板不上人	889.7700	平米	44.2800	39,220	313.54	35,154.23	2,982.99	
4023	地面防潮层沥青玻璃布卷材二布三油	2,121.4800	平米	10.3800	22,021	178.84	19,687.33	12,892.45	
8-84	预制砼板彩色砂浆面层	2,038.6800	平米	49.6143	101,148	306.21	97,705.78	1,932.46	
4111	现浇砼面层板板厚10cmC30	3,620.1600	平米	61.1600	221,409	2,695.93	176,193.19	103,972.44	
4262	预制砼雨蓬水平遮阳板	45.6000	平米	74.0600	3,377	56.42	2,393.54	1,641.25	
4239	现浇砼整体式楼梯C20同质地砖面	60.0300	平米	229.0600	13,750	255.93	10,062.23	8,604.63	
4281	伸缩缝墙面油浸麻丝铁皮盖面	10.8000	米	15.2000	164	2.77	132.62	157.14	
4280	伸缩缝屋面油浸麻丝镀锌铁皮盖面不靠墙	17.1000	米	51.1500	875	18.30	646.04	669.33	
4278	伸缩缝墙面油浸麻丝伸缩缝铁皮盖面	17.1000	米	25.7200	440	4.70	385.61	525.67	
4283	乳胶漆C15	249.0000	平米	26.7900	6,671	83.96	5,617.44	3,934.08	
4284	砂浆铺C15	434.3200	平米	40.0700	17,003	214.07	14,312.31	10,026.72	
4293	地面砼台阶C20同质地砖面	43.7200	平米	165.4900	7,235	73.32	6,194.25	5,937.37	
4129	现浇板层高3.6m每增3m	1,646.4000	平米	2.1300	3,507	132.86	1,959.22	481.24	
	小计			658,710		6,773.52	561,214.98	309,018.30	
门窗工程									
5040	硬木框三夹板门	244.4100	平米	152.3100	37,226	303.58	33,474.39	934.65	
5103	银白色铝合金推拉门	161.8200	平米	296.9500	48,052	122.51	45,973.06		
5089	银白色铝合金平开门	76.1400	平米	323.5700	24,789	56.34	23,827.25		
5104	银白色铝合金窗固定	89.2500	平米	178.9900	15,975	37.57	15,200.17		
5055	硬木大门平开	217.0800	平米	210.9100	45,784	370.86	41,264.74	10,943.35	
	小计			171,826		890.86	159,739.61	11,878.00	
装饰工程									
6049	无釉面砖(差价)水泥砂浆95°45墙面	2,111.3800	平米	64.7300	136,670	1,252.68	120,475.34	3,844.19	
6044	花岗岩(差价)水泥砂浆150°150墙面	723.2400	平米	27.4800	19,875	284.88	16,164.41	35,847.03	
6137	抹灰面油漆乳胶漆二遍	809.1000	平米	3.0400	2,460	35.36	2,022.75	659.25	
62-147	墙面墙裙墙面(木龙骨无夹板基层)五夹板	326.8500	平米	63.8407	20,866	182.84	18,554.29	3,460.66	
6148	多彩涂料墙、柱面抹灰面	9,340.1400	平米	11.1700	104,329	688.37	93,121.20	4,241.36	
62-252	多彩涂料天棚抹灰面	2,853.8400	平米	11.3850	33,062	252.28	29,108.03	1,295.93	
	小计			317,262		2,696.41	279,446.02	49,348.42	
耐酸、防腐、保温隔热工程									

Estimated Total Quantity
Shanghai Pudong International Airport Project(Fire Fighting and Rescue Engineering)
Main Fire Station(Building Works)

编号	名称	工程量	单位	单价	合价	人工数	材料费	主材差	备注	
7057	环氧煤焦油胶泥(平面)附磨光系20mm	82.8000	平米	103.3100	8,554	83.15	7,577.03			
7138	现浇水泥砂浆	91.7400	立米	103.5300	9,498	83.76	8,382.28	2,131.17		
	小计				18,052	166.91	15,959.31	2,131.17		
	合计				1,895,616	20,924.20	1,576,869.94	731,311.07		
	土方机械进出场费									
	履带式电动挖土机(铲斗挖土机)	1.0000	台次	859.0000	859					
	小计				859					
	垂直机械									
	垂直机械(场外)	1.0000	台次	4,996.0000	4,996					
	小计				4,996					
	土方及泥浆外运									
	土方运费(浦东及浦西内环线外)	4,235.7100	立米	30.0000	127,071					
	小计				127,071					

Shanghai Pudong International Airport Project

Main Fire Station

Item No.	Description of Works	Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
				Rate	Amount	Rate	Amount	
1	EARTHWORK						39150.00	
1.1	DIG SILT	CUBIC METRE	2000			11.42	22840.00	
1.2	FILLING WITH EARTH	CUBIC METRE	7000			2.33	16310.00	
2	ROAD						1098830.19	
2.1	C30 CEMENT CONCRETE 24CM	100 SQ.M	141			5092.65	718063.65	
2.2	2CM FINE STONE LEVELLING	100 SQ.M	154			76.97	11853.38	
2.3	15CM SECOND COAT CRUSHED STONE	100 SQ.M	154			1197.77	184456.58	
2.4	15CM SECOND COAT CRUSHED STONE	100 SQ.M	154			1197.77	184456.58	
3	GREENERY PATCHES	100 SQ.M	60			4000.00	240000.00	
	TOTAL						1377980.19	

SHANG HAI PU DONG INTERNATIONAL AIRPORT
RECOMBINATION CONSTRUCTION COST OF EQUIPMENT INSTALLATION

	A=基价 D=机械费	34043 3456	B=人工费 E=未计价材料费	16393 187838	C=材料费 F=设备费	14194 51800
(一) 定额直接费 = A+E						221881
(二) 人工费 = B						16393
(三) 其它直接费 = (二) * 23%						3770.39
(四) 直接费小计 = (一) + (三)						225651.4
(五) 综合间接费 = (二) * 180%						29507.4
(六) 利润 = (二) * 65%						10655.45
(七) 开办费 = (四) * 3%						6769.542
(八) 人工补差费 = (二) / 11.83 * 2.4元/工日						3326
(九) 施工流动津贴 = (二) / 11.83 * 2.5元/工日						3464.286
(十) 计价材料费差价 = C * 66%						9368
(十一) 机械费补差 = D * 97%						3352.32
(十二) 设备费 = F						51800
(十三) 设备运杂费 = (十二) * 3%						1554
(十四) 费用合计 = [(四) + (五) + + (十二) + (十三)]						345448.1
(十五) 定额编制管理费 = (四) * 0.05%						112.8257
(十六) 工程质量监督费 = (十四) * 0.15%						518.1722
(十七) 行业管理费 = (十四) * 0.15%						518.1722
(十八) 税金 = [(十四) + (十五) + (十六) + (十七) + (十八)] * 3.41%						11818.97
(十九) 总造价 = (十四) + (十五) + (十六) + (十七) + (十八)						358416.3

ESTIMATION CONSTRUCTION COST OF EQUIPMENT FACILITIES

SHANGHAI PUDONG INTERNATIONAL AIRPORT MAIN FIRE STATION POWER SYSTEM

第 1 页

序号	定额编号	设备及安装 工程名称	单位	数量	设备费(元)		材料费(元)		人工费(元)		机械费(元)		名称		单位	数量	单价	总价
					单价	合价	单价	合价	单价	合价	单价	合价	名称	合价				
1	22-47	电力配电系统安装	kw	259	0	2250.7	8.7	2250.7	5.5	1416.7	2.6	660.5	0.7	173.5	kg	1.6	2.75	1161.0
2	22-47	电力配电系统安装	kw	259	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kg	0.4	4.6	524.2	
3	22-47	电力配电系统安装	kw	259	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kg	3.3	4.6	3943.5	
4	22-47	电力配电系统安装	kw	259	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	m	3.5	1.2	1100.2	
5	22-80	照明配电系统安装	m	3678	0	12873.0	3.5	12873.0	1.4	5222.8	1.9	7098.5	0.2	551.7	kg	1.0	4.6	16411.2
6	22-80	照明配电系统安装	m	3678	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	m	4.9	1.2	21406.0	
7	22-53	照明配电箱安装	台	3	9000	27000	253.8	761.5	92.1	276.3	126.1	378.2	35.7	107.0	kg	1.6	2.75	13.4
8	22-54	照明配电箱安装	台	9	2000	18000	69.0	620.6	30.7	275.9	35.0	315.1	3.3	29.6	kg	1.6	2.75	40.3
9	22-58	自动配电箱安装	台	4	200	800	54.2	217.0	15.9	63.6	38.4	153.4	0.0	0.0	0	0.0	0	0.0
10	22-127	低压电箱头安装	个	5	200	1000	47.3	236.3	12.4	62.0	34.9	174.3	0.0	0.0	0	0.0	0	0.0
11	22-124	3X16+1X10敷设	100m	1.05	0	0	529.3	555.8	312.2	327.8	163.3	171.5	53.8	56.5	100m	1.1	2640	2910.6
12	22-124	3X10+1X6敷设	100m	1.8	0	0	529.3	952.7	312.2	561.9	163.3	294.0	53.8	96.9	100m	1.1	1800	3403.0
13	22-124	3X6+1X4敷设	100m	0.45	0	0	529.3	238.2	312.2	140.5	163.3	73.5	53.8	100m	1.1	1480	699.3	
14	22-124	3X4+1X2.5敷设	100m	2	0	0	529.3	1058.6	312.2	624.3	163.3	326.6	53.8	107.6	100m	1.1	870	1827.0
15	22-134	避雷网安装	m	2000	0	0	1.5	2900.0	0.6	1220.0	0.6	1240.0	0.2	440.0	kg	0.2	2.75	1210.0
16	22-136	避雷引下线	10m	8	0	0	8.3	66.5	2.1	17.0	3.0	23.6	3.2	25.8	0	0.0	0	0.0
17	22-140	角钢接地线	组	25	0	0	148.5	3713.3	92.8	2318.8	5.2	128.8	50.7	1266.3	kg	44.4	2.75	3053.9
18	22-151	接地母线安装	10m	35	0	0	30.1	1053.5	16.4	575.4	9.2	322.7	4.4	155.4	kg	7.9	2.75	760.4
19	22-144	避雷针安装	根	1	0	0	141.7	141.7	78.0	78.0	46.9	46.9	16.8	16.8	kg	12.8	2.75	35.2
20	22-144	避雷针安装	根	1	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	kg	33.1	4.6	152.2	
				小计		46800		27639	13181		11407	3051						58650

ESTIMATION CONSTRUCTION COST OF EQUIPMENT FACILITIES

SHANGHAI PUDONG INTERNATIONAL AIRPORT MAIN FIRE STATION POWER SYSTEM

序号	设备名称	单位	数量	设备费(元)		材料费(元)		人工费(元)		机械费(元)		名称		单位	数量	单价	总价
				单价	合价	单价	合价	单价	合价	单价	合价	名称	单位				
21	接地装置	系统	1	0	0	236.3	236.3	118.3	118.3	6.0	6.0	112.0	0	0	0	0	0.0
22	成束型航空灯	10套	8.5	0	0	59.3	503.7	31.4	266.5	27.9	237.2	0.0	灯具	10套	1.0	4036	34649.1
23	成束型航空灯	10套	11.6	0	0	59.3	687.4	31.4	363.7	27.9	323.8	0.0	灯具	10套	1.0	1680	19682.9
24	成束型航空灯	10套	5.4	0	0	59.3	320.0	31.4	169.3	27.9	150.7	0.0	灯具	10套	1.0	840	4581.4
25	航空灯	10套	4.3	0	0	106.3	457.3	56.3	242.2	50.0	215.0	0.0	灯具	10套	1.0	3200	13897.6
26	航空灯	10套	4.5	0	0	134.8	606.6	39.4	177.1	95.5	429.6	0.0	灯具	10套	1.0	822	3736.0
27	航空灯	10套	2.9	0	0	62.4	181.1	37.8	109.7	21.7	63.0	2.9	灯具	10套	1.0	728	2132.3
28	航空灯	10套	0.4	0	0	106.3	42.5	56.3	22.5	50.0	20.0	0.0	灯具	10套	1.0	1860	751.4
29	航空灯	10套	5.7	0	0	53.6	305.3	35.9	204.7	17.6	100.5	0.0	灯具	10套	1.0	7450	42889.7
30	火灾报警系统	终端	90	0	0	33.4	3008.7	16.7	1502.1	13.8	1240.2	3.0	Dg20	kg	8.9	4.6	3665.6
31	火灾报警系统	终端	90	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	G20	kg	3.0	4.6	1249.5
32	火灾报警系统	终端	90	0	0	0.0	0.0	0.0	0.0	0	0	0	BV2.5	m	18.1	1.2	1952.6
33	火灾报警装置	套	1	5000	5000	54.7	54.7	35.8	35.8	0.9	0.9	18.1	0	0	0.0	0	0.0
	小计			5000		6403.7		3211.9		2786.9		404.8					129187.9
	合计			51800		34043		16393		14194		3456					187838

ESTIMATION CONSTRUCTION COST OF EQUIPMENT FACILITZE

Shanghai Pudong International Airport Prouect (Fire Fighting and Rescue Facilities)
Technological Design of Telephone Broadcast And TV Wiring For Main Fire Station

序号	名称	规格	单位	数量	概算总值 (元)	
					单价	总价
1	电话组线箱 (中间型)	XRH01 - 7	个	1	500.00	500.00
2	电话组线箱 (终端型)	XRH01 - 2	个	1	400.00	400.00
3	电视前端箱		个	1	300.00	300.00
4	电视插座		个	34	10.00	340.00
5	二分支器		个	17	50.00	850.00
6	广播插座		个	22	8.00	176.00
7	电话出线盒		个	18	50.00	900.00
8	扬声器 (5W)		个	14	150.00	2,100.00
9	扬声器 (10W)		个	8	200.00	1,600.00
10	电话线	HPV (1x2x0.5)	米	600	3.00	1,800.00
11	同轴电缆	SYV-75-5	米	200	16.00	3,200.00
12	广播线	RVB2X1	米	350	12.00	4,200.00
13	水煤气管	G70	米	15	60.00	900.00
14	水煤气管	G50	米	35	55.00	1,925.00

ESTIMATION CONSTRUCTION COST OF EQUIPMENT

Shanghai Pudong International Airport Project (Fire Fighting and Rescue Facilities)
Technological Design of Telephone Broadcast And TV Wiring For Main Fire Station

序号	名称	规格	单位	数量	概算总值 (元)	
					单价	总价
15	水煤气管	G25	千克	25	5.40	135.00
16	水煤气管	G15	千克	480	5.60	2,688.00
17	室内配线电缆	HPVV(30x2x0.5)	米	6	17.00	102.00
18	室外配线电缆	HYV2 (5x2x0.5)	米	44	10.00	440.00
19	对讲机		个	10	1,500.00	15,000.00
20	VHF收发信台		台	1	100,000.00	100,000.00
21	值班桌		个	1	500.00	500.00
22	功率放大器		个	1	3,000.00	3,000.00
23	UPS		个	1	1,000.00	1,000.00
24	电视天线	(一付VHF, 二付UHF)	套	1	1,500.00	1,500.00
25	红砖		块	800	0.40	320.00
	合计					143,876.00

RECOMBINATION CONSTRUCTION COST OF EQUIPMENT INSTALLATION INSTALLATION

Shanghai Pudong International Airport Project (Fire Fighting and Rescue Facilities)
Technological Design of Telephone Broadcast And TV Wiring For Main Fire Station

序号	名称	规格	单位	数量	概算总值 (元)	
					单价	总价
一	主要设备材料费					155,310.70
	(1) 设备材料原价					143,876.00
	(2) 供销部门手续费	(1) x 3%				4,316.28
	(3) 器材运杂费	(1) x 3%				4,316.28
	(4) 设备材料采购保管费	(1) x 1.5%				2,158.14
	(5) 通讯器材保险费	设备x 0.44%+电缆x 0.14%				644.00
二	施工费					35,562.14
	(1) 设备施工费	(一) x 20%				31,062.14
	(2) 管道施工费	150 x (30元/米)				4,500.00
三	工程管理费	[(一)+(二)]x2%				3,817.46
四	计划利润	[(一)+(二)+(三)]x3%				5,840.71
五	税金					1,465.14
	(1) 营业税	[(二)+(三)+(四)] x 3%				1,356.61
	(2) 城市建设维护费	营业税 x 7%				94.96
	(3) 教育附加费	营业税 x 1%				13.57
	合计	[(一)+.....+(五)]				201,996.15

RECOMBINATION CONSTRUCTION COST OF EQUIPMENT INSTALLATION

SHANGHAI PUDONG INTERNATIONAL AIRPORT MAINFIRE STATION AIR-CONDITION EXHAUST

一、	定额直接费		42747
二、	人工费		13060
三、	其它直接费		3004
四、	其它直接费小计	(一) + (三)	45751
五、	综合取费	(二) × 1.80%	23509
六、	利润	(二) × 6.5%	8489
七、	税金	(四) × 3%	1573
八、	人工工资	(二) + 2.9% × 2.4	2650
九、	人工流动津贴	(二) + 1.83 × 2.5	2760
十、	定额内计价材料差价	定额内计价材料费之和 × 8.4%	19518
十一、	机械费补贴	定额机械费之和 × 1.6%	44574
十二、	设备费		198888
十三、	设备运费	(十二) × 3%	5967
十四、	费用合计	(四) + (五) + ... + (十二) + (十三)	353479
十五、	定额间接费	(四) × 0.5%	23
十六、	工程质保管理费	(十四) × 1.5%	530
十七、	作业管理费	(十四) × 1.5%	530
十八、	税金	[(十四) + (十五) + (十六) + (十七)] × 3.41%	11133
十九、	工程造价	(十四) + (十五) + (十六) + (十七) + (十八)	365605

ESTIMATION CONSTRUCTION COST OF EQUIPMENT FACILITIES

SHANGHAI PUDONG INTERNATIONAL AIRPORT MAIN FIRE STATION AIR-CONDITION&EXHAUST

序 号	定 额 编 号	设备及安装工程名称	单 位	数 量	设备费 (元)		安装费 (元)		基 础		中 间		材 料					
					单 价	合 价	单 价	合 价	人 工 费 (元)	材 料 费 (元)	单 价	合 价	单 价	合 价	单 价	总 量	单 价	
1	23-46	空调水系统配管	KW	245		0	29.86	7,316	3,104	12.46	3,053	4.73	1,159	镀锌管	kg	17.95	44.72	
														镀锌管	kg	0.04	29.80	
														保温层	m ³	0.03	150.00	
														保护层	m ³	1.48	3.00	
														型钢	kg	1.80	4.00	
2	20-70	散热器	片	360		7,200.00	24.71	8,896	2.60	936	22.11	7,960	1.24	446				
3	24-57	蝶阀	个	48			14.66	704	3.71	178	10.95	526	1.32	63	蝶阀	个	1.01	300.00
4	23-69	轴流风机DCEDT35-11 3.15	台	1	5400	5,400	89.79	90	38.50	39	47.86	48	3.43	3				
5	23-77	屋顶风机轴流风机	台	2	8000	16,000	164.21	328	65.87	132	91.75	184	6.59	13				
6	23-75	排风扇	个	4	500	2,000	19.19	77	17.75	71	1.44	6						
7	23-173	铝合金单压百叶风口	m ²	3.52	650	2,288	5.09	18	4.73	17	0.33	1	0.03	0				
8	23-247	穿孔铝板消声器	m ²	4	4000	16,000	33.44	133.76	23.85	95	9.28	37.12	0.37	1				
9	23-7	镀锌钢板	10m ²	31			170.22	5,277	67.11	2,080	88.76	2,752	14.35	445	镀锌钢板	kg	88.70	5.08
10	23-61	风机盘管	台	50	3000	150,000	33.42	1,671	17.25	863	16.17	809			镀锌钢板	kg	88.70	5.08
															镀锌钢板	kg	88.70	5.08
															镀锌钢板	kg	88.70	5.08
11	24-32	镀锌控制钢管	10米	101			137.79	13,917	54.91	5,546	77.85	7,863	5.03	508	镀锌控制钢管	米	10.20	13.40
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22		小 计			198,888	198,888		38,426	13,060			23,236		38,426				
23		合 计			198,888	198,888		38,426	13,060			23,236		38,426				
24		零星工程费 5%						1,921										

ESTIMATION CONSTRUCTION COST OF EQUIPMENT FACILITIES

**Shanghai Pudong International Airport Project (fire Fighting and Rescue Facilities)
Indoor Water Supply And Sewage For Main Fire Station**

Item No.	Description of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
	Item	Model/Size			Rate	Amount	Rate	Amount	
1	Submersible Pump	AS10-2W/CB	p.c.	1			803.40	803.40	
2	Fire Hydrant	SG28/65-6	set	6			978.75	5,872.50	
3	Gas Hot Water Boiler	Gas Input 200kJ/hr	set	3			149,350.00	448,050.00	
4	Magnetic scale inhibitor	DN40	p.c.	1			313.20	313.20	
5	Full-Automatic Electrical Boiling Water Heater	N<10 kWatt.	set	3			5,150.00	15,450.00	
6	Full-Automatic Electrical Water Heater	N<3 kWatt.	set	4			1,545.00	6,180.00	
7	Butterfly Valve	DN80	p.c.	2			241.43	482.85	
8	Globe	DN15	p.c.	11			37.19	409.12	
9	Globe	DN20	p.c.	6			47.89	287.36	
10	Globe	DN25	p.c.	9			55.46	499.16	
11	Globe	DN32	p.c.	8			72.69	581.51	
12	Globe	DN40	p.c.	3			89.52	268.57	
13	Check Valve	DN40	p.c.	1			91.35	91.35	
14	Ball Valve	DN32	p.c.	6			256.88	1,541.26	
15	Automatic Gas Discharge Valve	DN15	p.c.	1			45.68	45.68	
16	Water Tap	DN15	p.c.	44			31.50	1,386.12	
17	Water Tap	DN20	p.c.	6			34.58	207.50	

ESTIMATION CONSTRUCTION COST OF EQUIPMENT FACILITIES

**Shanghai Pudong International Airport Project (fire Fighting and Rescue Facilities)
Indoor Water Supply And Sewage For Main Fire Station**

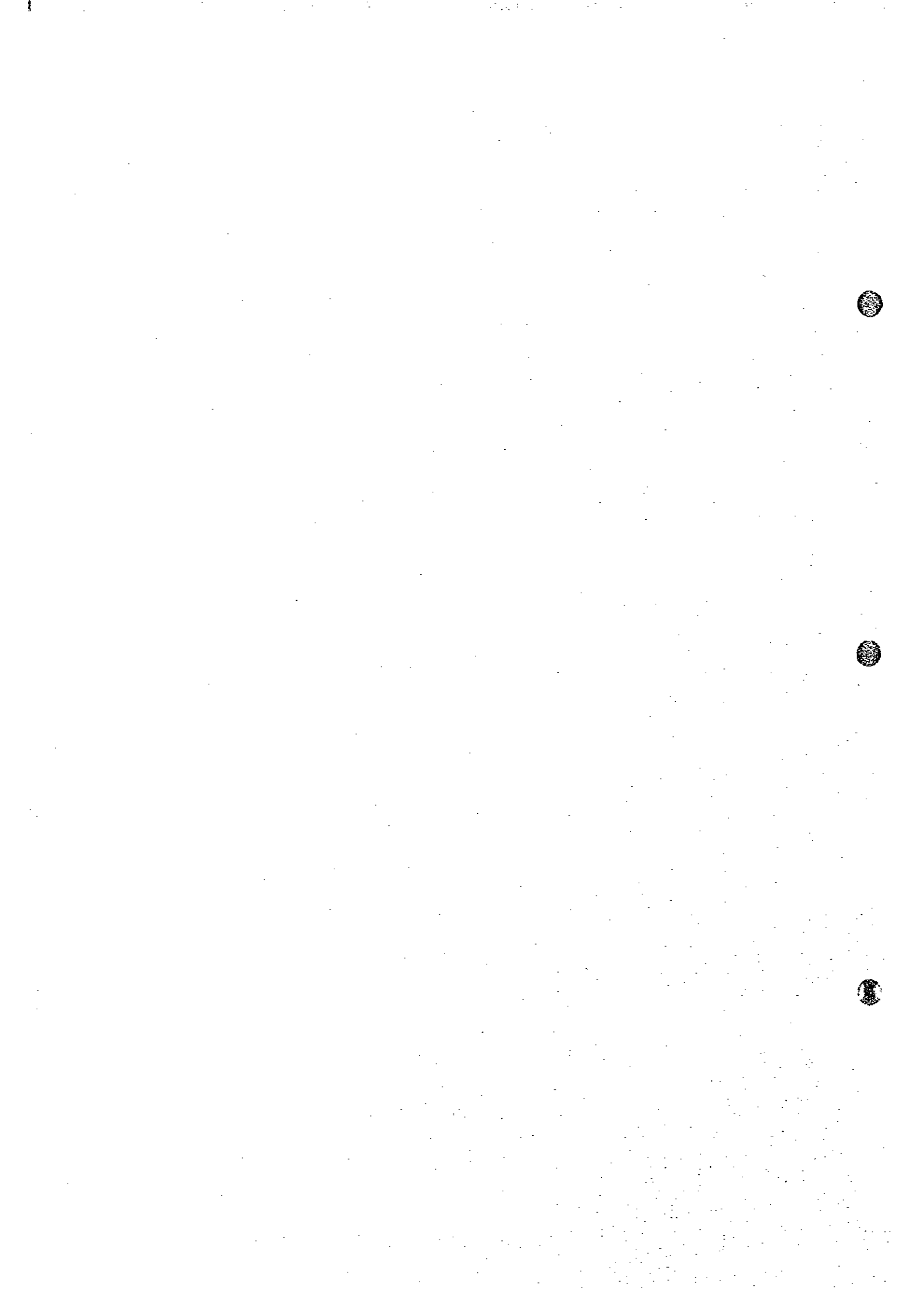
Item No.	Description of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China R
	Item	Model/Size			Rate	Amount	Rate	Amount	
18	Shower	DN15	set	10			23.49	234.90	
19	Metal Flexible Pipe	DN80	p.c.	2			110.93	221.85	
20	Urinal		set	11			423.11	4,709.16	
21	Closest		set	17			532.44	9,051.48	
22	Basin		set	17			437.92	7,444.62	
23	Galvanized Steel Pipe	DN15	m	72			32.10	2,311.42	
24	Galvanized Steel Pipe	DN20	m	70			35.89	2,512.13	
25	Galvanized Steel Pipe	DN25	m	65			40.19	2,612.61	
26	Galvanized Steel Pipe	DN32	m	95			44.11	4,190.36	
27	Galvanized Steel Pipe	DN40	m	33			46.46	1,533.11	
28	Galvanized Steel Pipe	DN50	m	19			54.68	1,038.91	
29	Galvanized Steel Pipe	DN65	m	42			65.90	2,767.91	
30	Galvanized Steel Pipe	DN80	m	103			102.18	10,524.69	
31	Cast Iron Drainage Pipe	DN50	m	135			83.39	11,257.58	
32	Cast Iron Drainage Pipe	DN75	m	52			102.44	5,327.01	
33	Cast Iron Drainage Pipe	DN100	m	140			141.33	19,786.41	
34	Cast Iron Drainage Pipe	DN150	m	5			178.52	892.62	

ESTIMATION CONSTRUCTION COST OF EQUIPMENT FACILITIES
Shanghai Pudong International Airport Project (fire Fighting and Rescue Facilities)
Indoor Water Supply And Sewage For Main Fire Station

Item No.	Description of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
	Item	Model/Size			Rate	Amount	Rate	Amount	
35	Round cast-iron Floor Drain	DN50	p.c.	18			37.67	678.13	
36	Round cast-iron Floor Drain	DN100	p.c.	1			49.99	49.99	
37	Round cast-iron Floor Drain	DN150	p.c.	1			60.96	60.96	
38	Cleanest	DN50	p.c.	2			25.88	51.75	
39	Cleanout	DN75	p.c.	5			38.81	194.06	
40	Cleanout	DN100	p.c.	14			41.40	579.60	
41	Cast-iron Vent Cowl	DN75	p.c.	2			35.50	71.00	
42	Cast-iron Vent Cowl	DN100	p.c.	2			50.61	101.22	
43	Checkhole	DN75	p.c.	4			19.15	76.59	
44	Checkhole	DN100	p.c.	4			24.43	97.70	
45	Portable Phosphate Power Extinguisher	MF4	p.c.	50			60.00	3,000.00	
									573,847.34



• 救急車庫 工事費積算



SHANGHAI PUDONG INTERNATIONAL AIRPORT
RECOMBINATION CONSTRUCTION COST OF EQUIPMENT INSTALLATION

	2544	1199	1146
A=总价		B=人工费	C=材料费
D=机械费	166	E=未计价材料费	12000
(一) 定额直接费, =A+E	18862		
(二) 人工费 =B	1199		
(三) 其它直接费 = (二) * 23%	275.77		
(四) 直接费小计 = (一) + (三)	19137.77		
(五) 综合间接费 = (二) * 180%	2158.2		
(六) 利润 = (二) * 65%	779.35		
(七) 开办费 = (四) * 9%	574.1331		
(八) 人工补差费 = (二) / 11.83 * 2.4元/工日	243		
(九) 施工流动津贴 = (二) / 11.83 * 2.5元/工日	253.3812		
(十) 计价材料费差价 = C * 66%	756		
(十一) 机械费补差 = D * 97%	161.02		
(十二) 设备费 = F	12000		
(十三) 设备运费 = (十二) * 3%	360		
(十四) 费用合计 = [(四) + (五) + + (十二) + (十三)]	36423.46		
(十五) 定额编制管理费 = (四) * 0.05%	9.568885		
(十六) 工程质量监督费 = (十四) * 0.15%	54.63519		
(十七) 行业管理费 = (十四) * 0.15%	54.63519		
(十八) 税金 = [(十四) + (十五) + (十六) + (十七) * 3.41%	1246.092		
(十九) 总造价 = (十四) + (十五) + (十六) + (十七) + (十八)	37788.39		

ESTIMATION CONSTRUCTION COST OF EQUIPMENT FACILITIES

SHANGHAI PUDONG INTERNATIONAL AIRPORT FIRST AID GARAGE POWER SUPPLY SYSTEM

序号	定编 编号	设备及安装 工程名称	单 位	数 量	设备费(元)		基价(元)		其他		中		计		材 料 总 价		
					单 价	合 价	单 价	合 价	人 工 费	材 料 费	机 械 费	名 称	单 位	数 量		单 价	
1	22-54	照明配电箱安装	台	1	2000	2000	69.0	69.0	30.7	30.7	35.0	35.0	3.3	3.3	2.0	2.75	5.5
2	22-53	控制柜安装	台	1	10000	10000	253.8	253.8	92.1	92.1	126.1	126.1	35.7	35.7	25.2	2.75	69.3
3	22-80	照明配电箱安装	m	323	0	0	3.5	1130.5	1.4	458.7	1.8	591.1	0.2	48.5	1.0	4.6	1441.2
4	22-80	照明配电箱安装	m	323	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	1.2	1879.9
5	22-84	荧光灯安装	10套	0.4	0	0	59.3	23.7	31.4	12.5	27.9	11.2	0.0	0.0	1.0	4036	1630.5
6	22-85	防水防尘灯	10套	0.1	0	0	62.4	6.2	37.8	3.8	21.7	2.2	2.9	0.3	1.0	728	73.5
7	22-82	吸顶灯具	10套	0.2	0	0	134.8	27.0	39.4	7.9	95.5	19.1	0.0	0.0	1.0	822	166.0
8	22-94	板状灯	10套	2.5	0	0	106.3	265.9	56.3	140.8	80.0	125.0	0.0	0.0	1.0	3200	8080.0
9	22-124	3*25+1*16敷设	100m	0.49	0	0	529.3	259.4	312.2	153.0	163.3	80.0	53.8	26.4	1.0	3867	1913.8
10	22-124	3*6+1*4敷设	100m	0.35	0	0	529.3	185.3	312.2	109.3	163.3	57.2	53.8	18.8	1.0	1480	523.2
11	22-124	3*4+1*2.5敷设	100m	0.61	0	0	529.3	322.9	312.2	190.4	163.3	99.6	53.8	32.8	1.0	869	535.4
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21		合 计				12000		2543.5		1199.1		1146.4		165.7			16318.4

RECOMBINATION CONSTRUCTION COST OF EQUIPMENT INSTALLATION INSTALLATION

Shanghai Pudong International Airport Project (Fire Fighting and Rescue Facilities)
 Technological Design of Wiring for First Aid Garage

序号	名称	规格	单位	数量	概算总值 (元)	
					单价	总价
一	主要设备材料费					1,841.12
	(1) 设备材料原价					1,695.00
	(2) 供销部门手续费	(1) x 3%				50.85
	(3) 器材运杂费	(1) x 3%				50.85
	(4) 设备材料采购保管费	(1) x 1.5%				25.43
	(5) 通讯器材保险费	设备 x 0.44% + 电缆 x 0.14%				18.99
二	施工费					943.22
	(1) 设备施工费	(一) x 20%				368.22
	(2) 管道施工费	23 x (25元/米)				575.00
三	工程管理费	[(一)+(二)]x2%				55.69
四	计划利润	[(一)+(二)+(三)]x3%				85.20
五	税金					1,170.84
	(1) 营业税	[(二)+(三)+(四)] x 3%				1,084.11
	(2) 城市建设维护费	营业税 x 7%				75.89
	(3) 教育附加费	营业税 x 1%				10.84
	合计	[(一)+.....+(五)]				4,096.07

ESTIMATION CONSTRUCTION COST OF EQUIPMENT FACILITIES

Shanghai Pudong International Airport Project (Fire Fighting and Rescue Facilities)

Indoor Water Supply And Sewage For first Aid Garage

Item No.	Description of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
	Item	Model/Size			Rate	Amount	Rate	Amount	
1	Galvanized steel pipe	DN80	M	10			102.18	1,021.82	
2	Galvanized steel pipe	DN65	M	35			65.90	2,306.59	
3	Galvanized steel pipe	DN50	M	15			54.68	820.19	
4	Galvanized steel pipe	DN40	M	10			46.46	464.58	
5	Galvanized steel pipe	DN25	M	15			40.19	602.91	
6	Galvanized steel pipe	DN15	M	10			32.10	321.03	
7	Drainage cast iron pipe	DN100	M	15			141.33	2,119.97	
8	Drainage cast iron pipe	DN50	M	10			83.39	833.90	
9	Tap	DN15	Piece	2			31.50	63.01	
10	Stop valve	DN50	Piece	1			102.70	102.70	
11	Stop valve	DN40	Piece	1			89.52	89.52	
12	Stop valve	DN25	Piece	1			55.46	55.46	
13	Portable dry-powder extinguisher	MF8	Piece	4			143.55	574.20	
14	Fire hydrant(90 single outlet)	SNA65	Piece	4			978.75	3,915.00	
									13,290.88