2010 世博会泰国馆方案

2010 Expo Thai Pavilion Concept

计算报告

Structure Calculation Report

模型计算：应伟

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一 计算模型基本资料 Basic information of Model Calculation

1、设计年限、结构等级、地震烈度

Life time of building, Structure Level, Earth Quake intensity

1)、 设计年限为 1 年。

Life time of building is 1 year.

2)、结构安全等级为二级；结构安全性系数 0.9。

Structure safety levl class 2, Structure safety factor 0.9

3)、世博会园区地震基本烈度为 7 度，设计基本地震加速度值为 0.10g（g 为重力加速度）。IV 类场地，设计地震分组为第一组。

The World Expo area, the basic earthquake intensity is 7 degrees, the design value of the basic seismic acceleration 0.10g (g is the acceleration due to gravity). Class IV, the design division for the first group of earthquakes.

2、设计依据及相关规范：

Design Regulation

1)、 世博会临时建筑物、构筑物设计标准（上下册）（结构专篇）

Design Standard for Temporary Buildings and Constructions of the World EXPO (Structural Chapter)

2)、 世博会临时建筑物、构筑物防火设计标准

Design Standard for Temporary Buildings and Structures of the World EXPO (Special Specification for Fire Protection)

3)、 世博会临时建筑物、构筑物施工质量验收标准

Design Standard for Temporary Buildings and Constructions of the World EXPO (Construction Chapter)

4)、 建筑结构可靠度设计统一标准(GB 50068-2001);

Unified Standard for Reliability Design of Building Structures (GB 50068 - 2001) ;

5)、 建筑工程抗震设防分类标准（GB 50223 - 2008）;

Standard for Classification Of Seismic Protection of Building Constructions (GB 50223 - 2008) ;

6)、 建筑结构荷载规范（GB 50009-2001，2006 年版）;

Load Code for Design of Building Structures (GB 50009-2001, 2006) ;

7)、 建筑地基基础设计规范（GB 50007-2002）;

Code for Design of Building Foundation (GB 50007-2002) ;

8)、 混凝土结构设计规范（GB 50010-2002）;

Code for Design of Concrete Structures (GB 50010-2002) ;

9)、 钢结构设计规范（GB 50017-2003）;

Code for Design of Steel Structures (GB 50017-2003) ;

10)、 建筑抗震设计规范（GB 50011-2001，2008 局部修订版）;

Code for Seismic Design of Buildings (GB 50011-2001, 2008 revision) ;

11)、 建筑桩基技术规范（JGJ 94-2008）;

Construction of Foundation Technical Specification Regulation (JGJ 94-2008);

12)、 建筑防火规范（GBJ 16-87 2001 年版）;

Code of Design on Building Fire Protection And Prevention (GBJ 16-87 2001)

13)、 钢结构工程施工质量验收规范（GB 50205-2001）;

Code for Construction Quality Acceptance of Steel Structure Engineering (GB 50205-2001)

14)、 碳素结构钢（GBT/ 700-88）;

Carbon Structure Steel (GBT/-700-88)

15)、 低合金高强度结构钢（GB/T 1591-94）;

High Strength Low Alloy Structural Steels (GB/T 1591-94)

16)、 建筑钢结构焊接规程（JGJ 81-2002）;

Technical Specification for Welding of Steel Structure of Building (JGJ 81-2002)

17)、 涂装前钢材表面除锈和除锈等级（GB 8923-88）;

Pre-painting Steel Surface Rustiness Grade And Derusting Grade (GB 8923-88)

18)、 建筑钢结构防火技术规范（CECS 200:2006）;

Technical Code for Fire Safety of Steel Structure In Buildings (CECS 200：2006)

19)、 钢结构用高强度扭剪型大六角头螺栓，大六角头螺母，垫圈等技术条件

(GB 1228-1231-1991) ;

Technical Requirement for Torshear Type High Strength Bolts And Nuts With Large Hexagon Head And Washers for Steel Structures. (GB 1228-1231-1991)

20)、 钢结构高强度螺栓连接的设计、施工及验收规程（JGJ 82-91）;

Techincal Code for The Design, Construction And Check of High Strength Bolts for Steel Structures. (JGJ 82-91)

21)、 钢结构防火涂料应用技术规程 CECS24

Technical Code for Fire Retandent Coating Applied on Steel Structure In Buildings (CECS 24)

3、 单元类型 Type of Structure

1)、 梁单元（用于柱，梁）Beam element (for columns, beams)

2)、 板单元（用于风荷载的导入）Plate element (for import wind loads)

4、 材料 Material

1)、 梁单元 （Q235B）Beam

弹性模量= 2.06E5 MPa 泊松比=0.3 容重=7.85 吨/米 3

Elastic Modulus= 2.06E5 MPa Poisson Ratio=0.3 Bulk Density=7.85 ton/3 M

二 建筑荷载及工况组合：Construction Dead Load & Live Load

1、 恒载：Dead Load

2)、 夹层楼面荷载：Mazzanine Floor Load

80mm厚压型钢板上浦混凝土板自重： 25x(0.089+0.051/2)=2.64KN/m²

80 mm Thick Metal deck with infilled with concrete slab load

1mm厚压型钢板自重（肋高 51mm）: 78.5x0.001*1.5 =0.1KN/m²

1mm.Thick Metal Deck load (High Ribbed 51mm)

50mm厚水泥抹灰： 20x0.05=1.0KN/m²

50 mm.Thick Cement mortar load

吊顶: Ceiling 0.5KN/m2

夹层楼面荷载合计: **4.24 KN/m²**

Mazzanine Floor Total Loads

3)、屋面荷载(压型钢板+混凝土组合楼板)：Roof loads (Metal deck+ concrete composite floor)

80mm厚压型钢板上浦混凝土板自重： 25x(0.089+0.051/2)=2.64KN/m²

80 mm Thick Metal deck infilled with concrete slab load

1mm厚压型钢板自重（肋高 51mm）: 78.5x0.001*1.5 =0.1KN/m²

1mm.Thick Metal Deck load (High Ribbed 51mm)

50mm厚水泥抹灰： 20x0.05=1.0KN/m²

50 mm.Thick Cement mortar load

吊顶: Ceiling 0.5KN/m²

防水保温材料： 1.0KN/m²

Water proofed insulation material

屋面荷载(压型钢板+混凝土组合楼板)合计: **5.24KN/m²**

Roof loads (Metal deck+ concrete composite floor) Total Loads

4)、屋面荷载(压型钢板复合保温屋面（有屋面瓦片）:

Roof loads (Metal sheet with thermal insulation roof)

1mm厚压型钢板自重（肋高 51mm）: 78.5x0.001x1.5=0.1KN/m²

1mm.Thick Metal sheet load (High Ribbed 51mm)

50 厚玻璃保温棉 1.0x0.05=0.05KN/m^2

50mm.thick Micro fiber layer

吊顶: Ceiling 0.5KN/m^2

防水材料Water proofed material 0.5KN/m^2

屋面瓦片:Roof tile 1.1KN/m^2

屋面荷载(压型钢板复合保温屋面（有屋面瓦片）)合计: 2.25 KN/m^2

Roof Loads (Metal sheet with thermal insulation roof) Total loads

5)、 屋面荷载(压型钢板复合保温屋面（无屋面瓦片）)：

Roof Loads (Metal sheet with thermal insulation roof)

1mm厚压型钢板自重（肋高 51mm）: 78.5x0.001x1.5=0.1KN/m^2

1mm.Thick Metal sheet load (High Ribbed 51mm)

50 厚玻璃保温棉 1.0x0.05=0.05KN/m^2

50mm.thick Micro fiber layer

吊顶: Ceiling 0.5KN/m^2

防水材料Water proofed material 0.5KN/m^2

屋面荷载(压型钢板复合保温屋面（无屋面瓦片）)合计: 1.15 KN/m^2

Roof Loads (Metal sheet with thermal insulation roof) Total loads

6)、 第一展示馆小屋面装饰物重量附加恒载 8.6 KN/m^2，附加总重约为 10 吨左右。

Exhibition hall 1 small roofing widget weight attachment dead load 8.6 KN/m2, the additional gross weight approximately is about 10 tons

7)、 墙体自重(3m)：

Wall Load (3 M)

240mm标准砖荷载：18x0.24x2.65=11.5 KN/m^2

240 mm.thick Standard wall Load

20mm厚水泥砂浆双面粉刷：2x20x0.02x2.65=2.2 KN/m^2

20 mm thick 2 sides of Cement Moratar plaster

恒载合计=11.5+2.2=13.5KN/m^2

Total dead load of 240 mm thick wall

120mm标准砖荷载：18x0.12x2.65=5.8 KN/m^2

120 mm.thick Standard wall Load

20mm厚水泥砂浆双面粉刷：2x20x0.02x2.65=2.2 KN/m^2

20 mm thick 2 sides of Cement Moratar plaster

恒载合计=5.8+2.2=8.0KN/m^2

Total dead load of 120 mm thick wall

2、活载：

Live Load

空气处理机组室	7.0 KN/m^2
AHU room	
投影机与控制室	7.0 KN/m^2
Projecting camera and control room	
控制室	7.0 KN/m^2
Control room	
厨房储藏室	5.0 KN/m^2
Kitchen and storage	
金属屋面（不上人）	0.5 KN/m^2
Metal roof(Not for service)	
楼梯	2.0 KN/m^2
Staircase	

3、风载 Wind Load

Wk（标准值 Standard Value **）=β_z*μ_s*μ_z*w_o**

基本风压：w_o =0.55KN/ M^2

Basic wind pressure

地面粗糙度：B 类θ

Surface Roughness: B Type 8

$w_o*T_1*T_1$=(0.55*0.013*15*0.013*15)=0.02 (此值是根据规范附录E This value is based on normative appendix **E**)

脉动增大系数ξ=1.57　脉动影响系数v=1.0　振型系数φ_z=1.0

Fluctuating amplifying coefficient ξ=1.57　Ripple effects of coefficient v=1.0　Shape factor φz=1.0

高度 15m 处的风振系数 Wind-induced vibration coefficient **at 15 M height**

β_z=1+（ξ*v*φz）/μ_z=1+(1.57*1.0*1.0)/1.14=2.38

当Whenμ_s=+0.8 时

Wk（标准值 Standard Value）=$\beta_z*\mu_s*\mu_z*w_o$=2.38*(+0.8)*1.14*0.55=1.19

当Whenμ_s=+0.6 时

Wk（标准值Standard Value）=$\beta_z*\mu_s*\mu_z*w_o$=2.38*(+0.6)*1.14*0.55=0.90

当Whenμ_s=-0.5 时

Wk（标准值Standard Value）=$\beta_z*\mu_s*\mu_z*w_o$=2.38*(-0.5)*1.14*0.55=0.75

当Whenμ_s=-0.7 时

Wk（标准值Standard Value）=$\beta_z*\mu_s*\mu_z*w_o$=2.38*(-0.7)*1.14*0.55=-1.05

大屋面风荷载

当Whenμ_s=-0.8 时

Wk（标准值Standard Value）=$\beta_z*\mu_s*\mu_z*w_o$=2.38*(-0.8)*1.14*0.55=-1.19

当Whenμ_s=-1.4 时

Wk（标准值Standard Value）=$\beta_z*\mu_s*\mu_z*w_o$=2.38*(-1.4)*1.14*0.55=-2.09

4、 地震作用

Seismic Action

世博会园区地震基本烈度为 7 度，设计基本地震加速度值为 0.10g（g 为重力加速度）。IV

类场地，设计地震分组为第一组。计算中采用反应谱分析。

World Expo Park, the basic earthquake intensity is 7 degrees, the design value of the basic seismic acceleration 0.10g (g is the acceleration due to gravity). Class IV site, the design division for the first group of earthquakes. Used in calculating the response spectrum analysis.

5、荷载组合

Seismic Action

1)、结构荷载模式简表：

Structure Model Load Summary Table

标号 No.	内容 Description	备注 Remark
1	钢构件，墙体及楼板自重 Structure,Wall & Slab load	（SD）
2	楼面及屋面活荷载 Live load of slab and roof	（L）
3	风荷载（压） Wind load (Pressure)	（+W）
4	风荷载（吸） Wind Load (Absorptivity)	（-W）
5	反应谱 Response spectrum	（E）

2)、 工况组合

Status of Portfolio

标准组合

Standard Combination

1. 1.0*SD+1.0*L
2. 1.0*SD+1.0*Wx
3. 1.0*SD-1.0*Wx
4. 1.0*SD+1.0*Wy

5. 1.0*SD-1.0*Wy
6. 1.0*SD+1.0*L+0.6*Wx
7. 1.0*SD+1.0*L-0.6*Wx
8. 1.0*SD+1.0*L+0.6*Wy
9. 1.0*SD+1.0*L-0.6*Wy
10. 1.0*SD+0.7*L+1.0*Wx
11. 1.0*SD+0.7*L-1.0*Wx
12. 1.0*SD+0.7*L+1.0*Wy
13. 1.0*SD+0.7*L-1.0*Wy
14. 1.0*SD+0.5*L+1.0*Ex+0.2Wx
15. 1.0*SD+0.5*L+1.0*Ex-0.2Wx
16. 1.0*SD+0.5*L+1.0*Ey+0.2Wy
17. 1.0*SD+0.5*L-1.0*Ey+0.2Wy

设计组合

Design portfolio

1. 1.35*SD+0.7*1.4*L
2. 1.20*SD+1.4*L
3. 1.20*SD+1.4*Wx
4. 1.20*SD-1.4*Wx
5. 1.20*SD+1.4*Wy
6. 1.20*SD-1.4*Wy
7. 1.20*SD+1.4*L+0.6*1.4*Wx
8. 1.20*SD+1.4*L-0.6*1.4*Wx

9. 1.20*SD+1.4*L+0.6*1.4*Wy

10. 1.20*SD+1.4*L-0.6*1.4*Wy

11. 1.20*SD+0.7*1.4*L+1.4*Wx

12. 1.20*SD+0.7*1.4*L-1.4*Wx

13. 1.20*SD+0.7*1.4*L+1.4*Wy

14. 1.20*SD+0.7*1.4*L-1.4*Wy

15. 1.20*SD+0.5*1.4*L+1.3*Ex

16. 1.20*SD+0.5*1.4*L-1.3*Ex

17. 1.20*SD+0.5*1.4*L+1.3*Ey

18. 1.20*SD+0.5*1.4*L-1.3*Ey

19. 1.20*SD+0.5*1.4*L+1.3*Ex+0.2*1.4*Wx

20. 1.20*SD+0.5*1.4*L-1.3*Ex+0.2*1.4*Wx

21. 1.20*SD+0.5*1.4*L+1.3*Ex-0.2*1.4*Wx

22. 1.20*SD+0.5*1.4*L-1.3*Ex-0.2*1.4*Wx

23. 1.20*SD+0.5*1.4*L+1.3*Ey+0.2*1.4*Wy

24. 1.20*SD+0.5*1.4*L-1.3*Ey+0.2*1.4*Wy

25. 1.20*SD+0.5*1.4*L+1.3*Ey-0.2*1.4*Wy

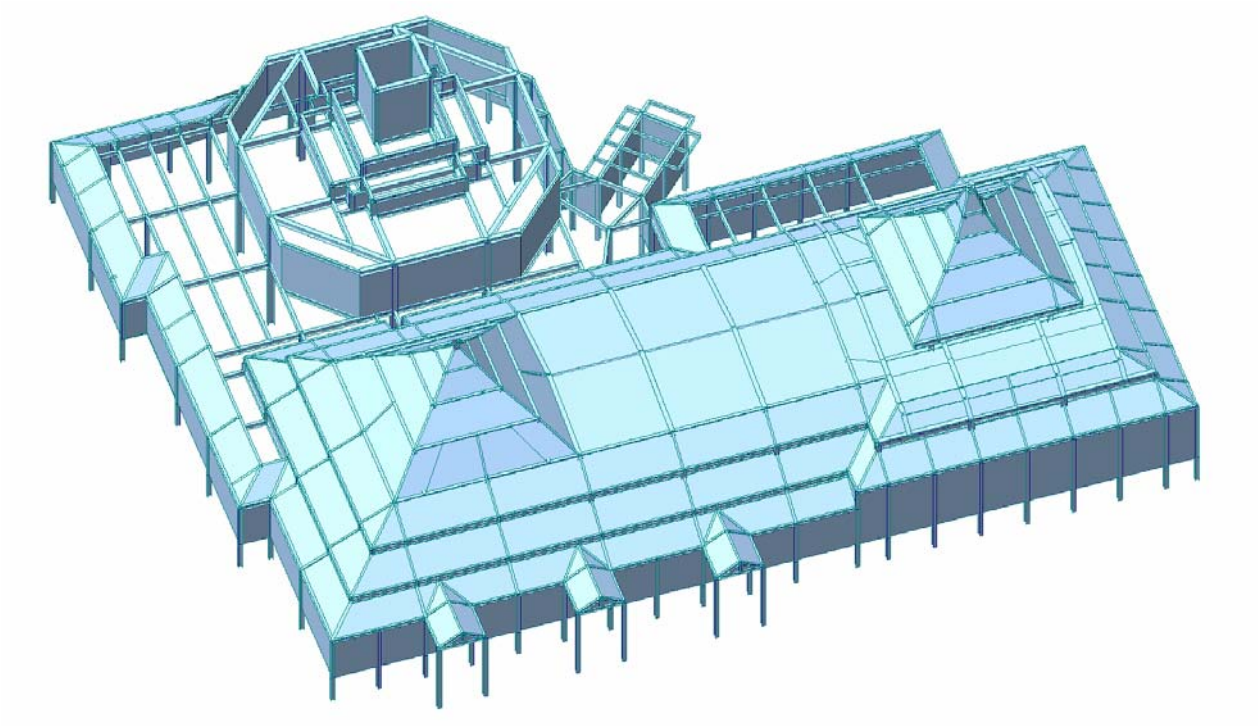
26. 1.20*SD+0.5*1.4*L-1.3*Ey-0.2*1.4*Wy

三　计算模型及荷载简图

Model and Load Diagram Calculation

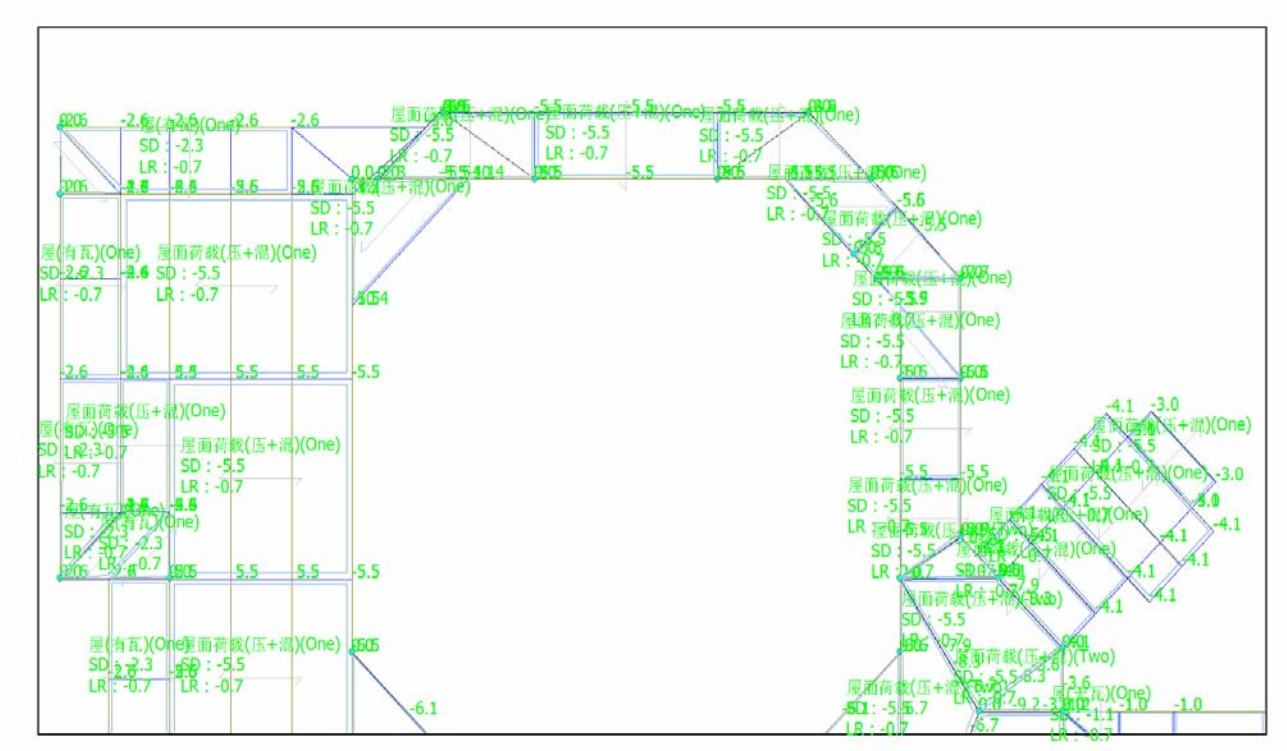
1、计算模型简图

Model Diagram Calculation

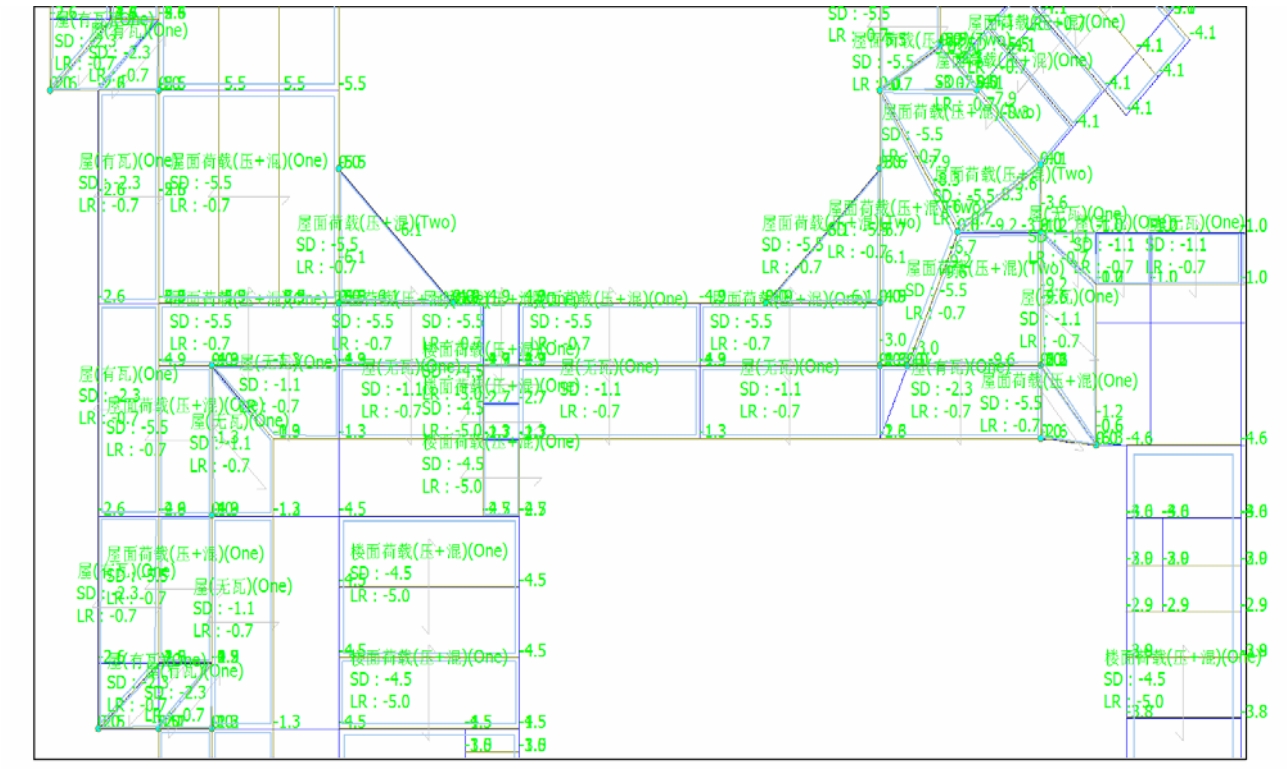


2、 楼、屋面荷载简图

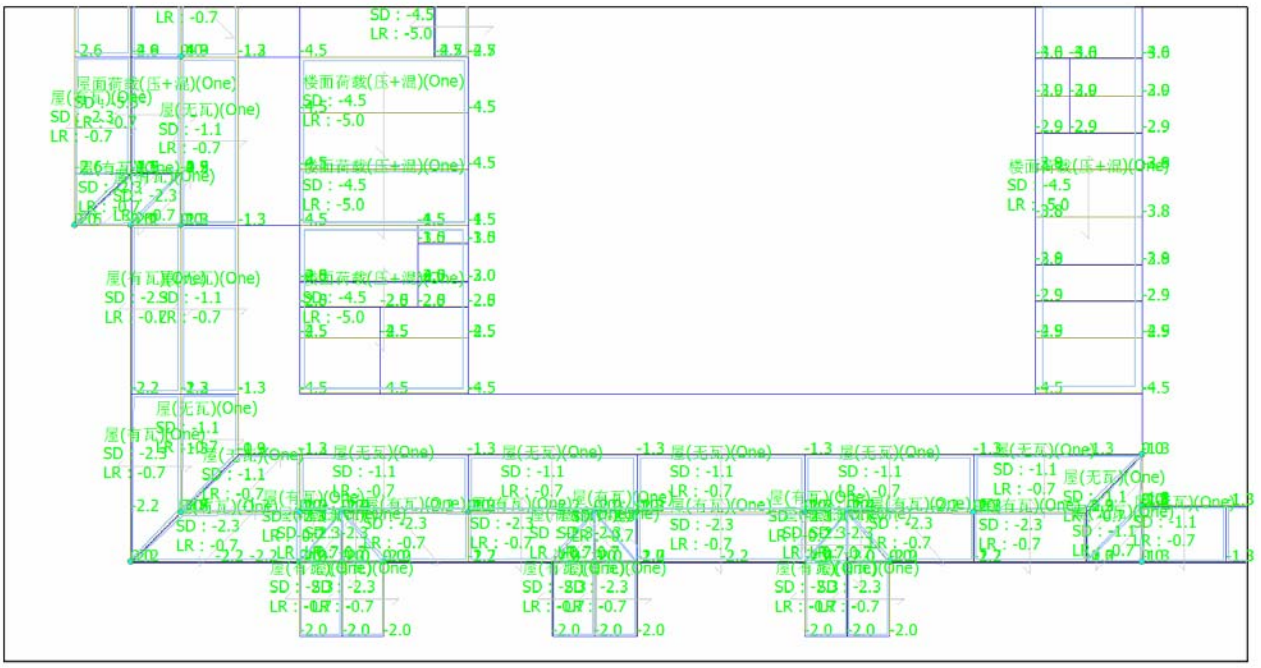
Floor, Roof Load Diagram



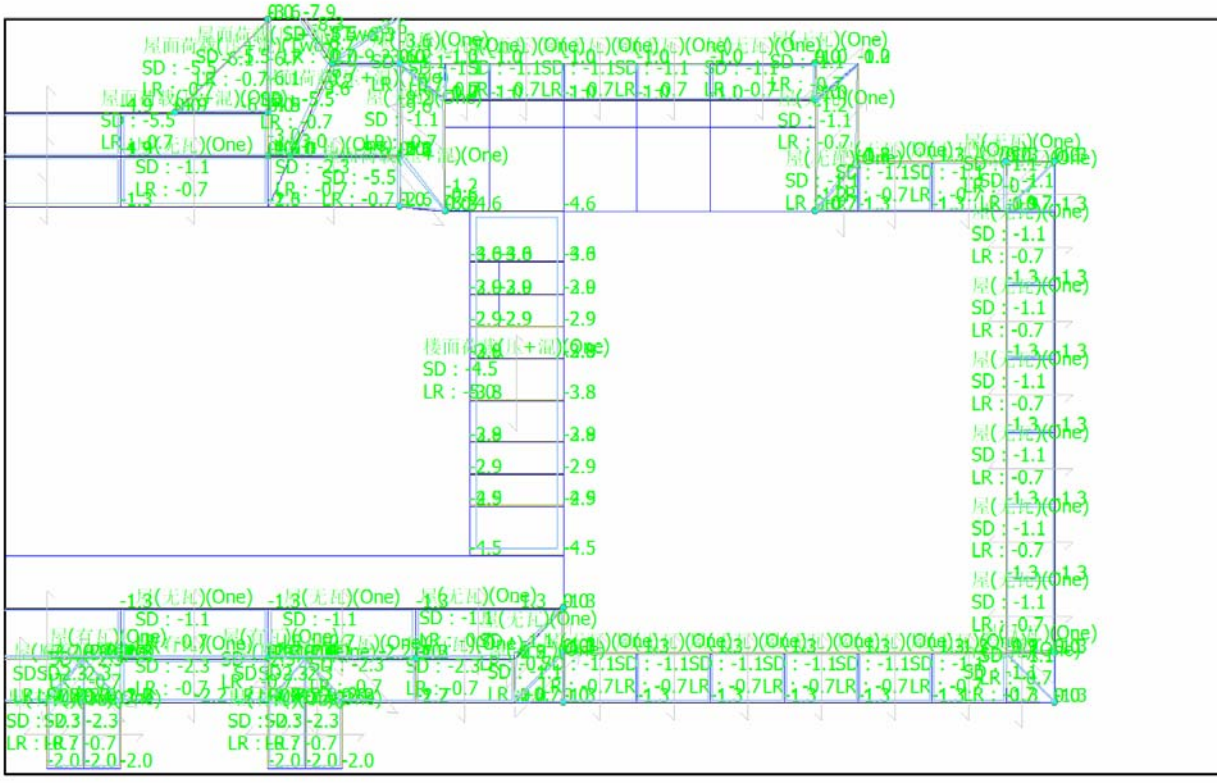
楼面荷载简图之一 Part 1 Floor Load Diagram



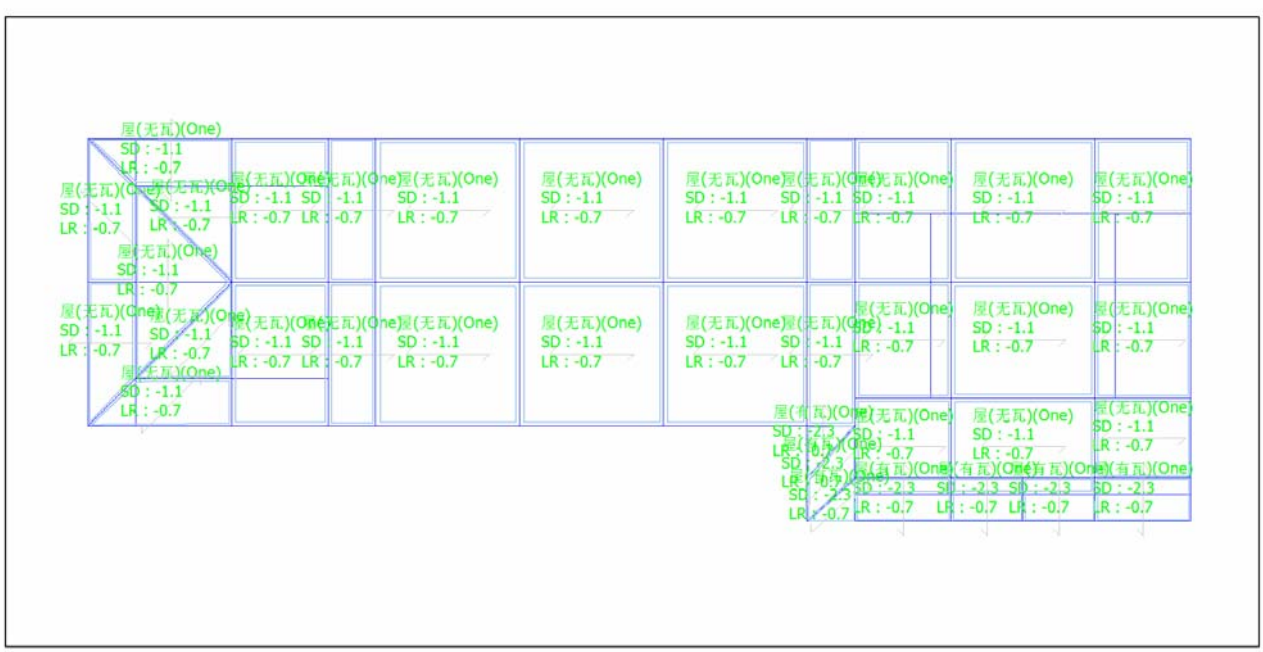
楼面荷载简图之二 Part2 Floor Load Diagram



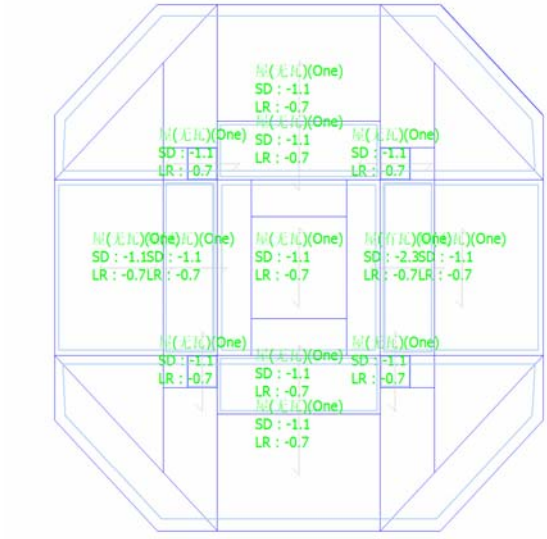
楼面荷载简图之三 Part3 Floor Load Diagram



楼面荷载简图之四 Part4 Floor Load Diagram

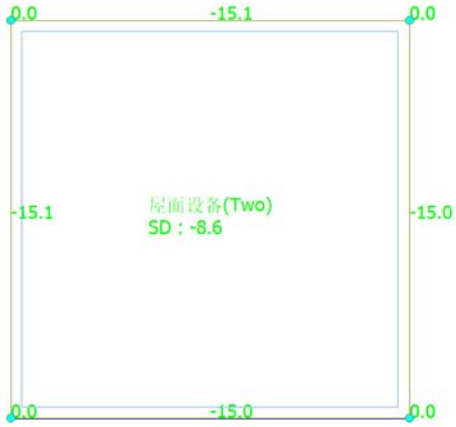


大屋面荷载简图 Roof Load Diagram



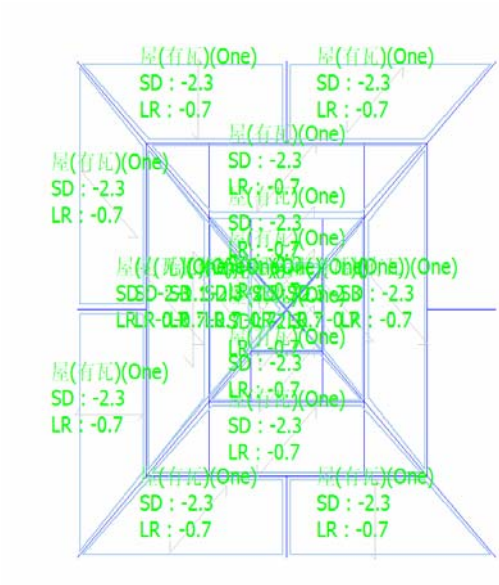
第一展馆大屋面荷载简图

Exhibition Hall1 Roof Load Diagram



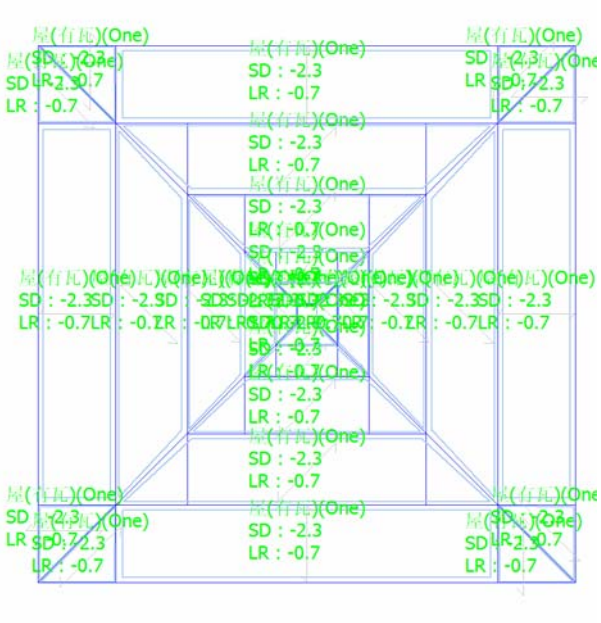
第一展馆小屋面荷载简图

1 Layer of Outdoor Stage Roof Load Diagram



第二展馆屋面荷载简图

Exhibition Hall 2 Roof Load Diagram

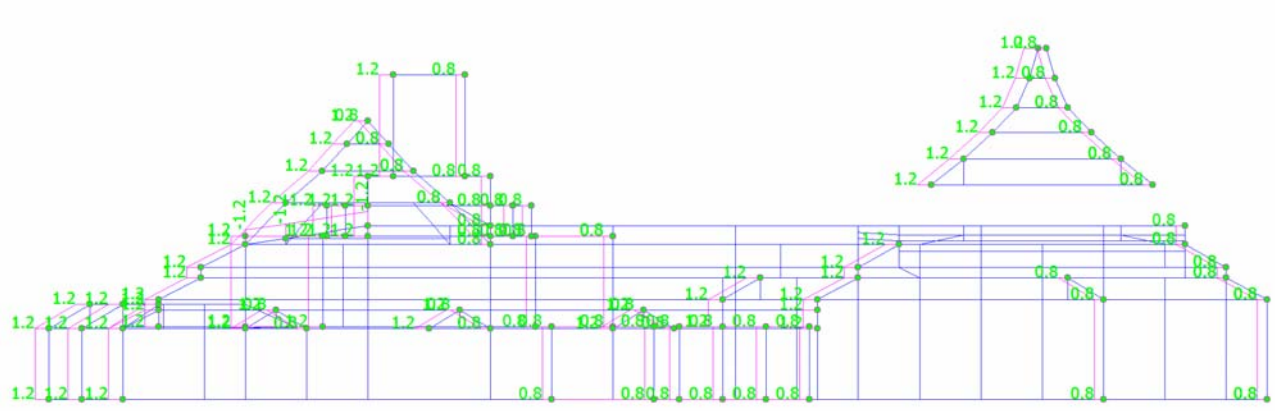


第三展馆屋面荷载简图

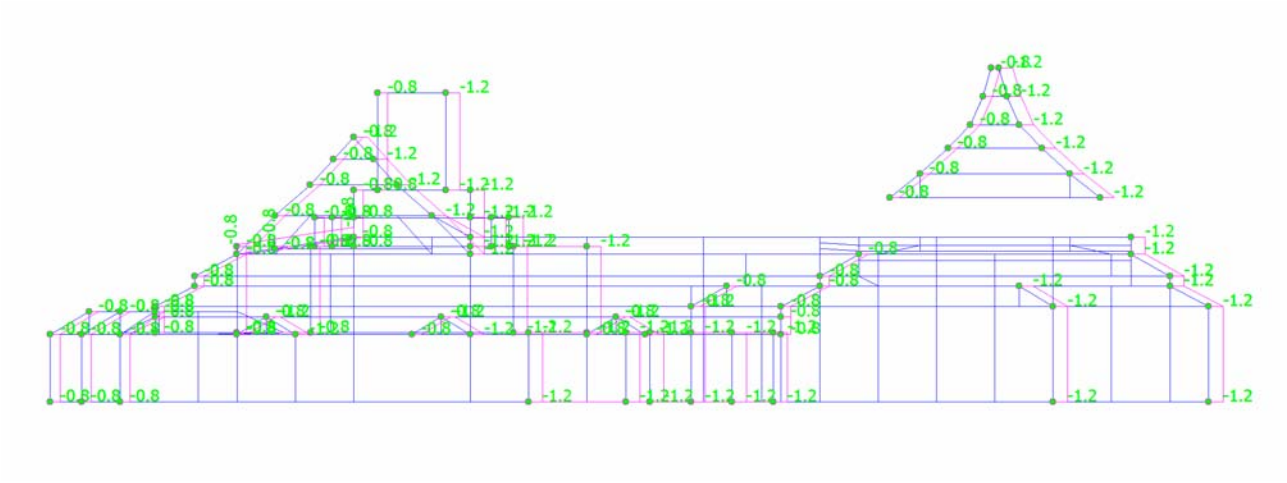
Exhibition Hall 3 Roof Load Diagram

3、 风荷载简图

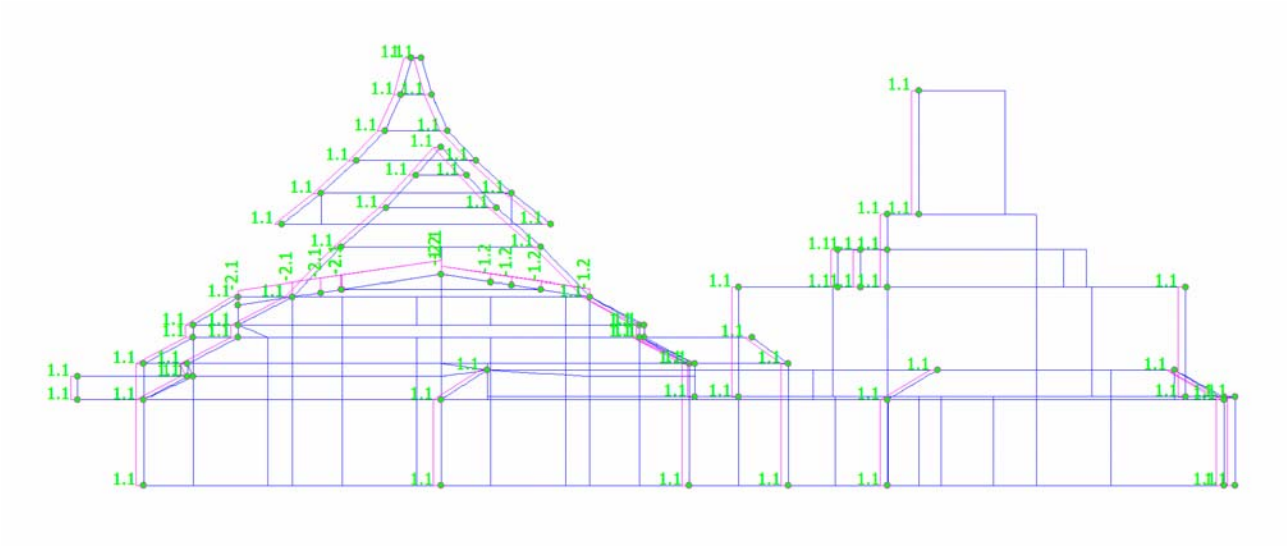
Wind Load Diagram



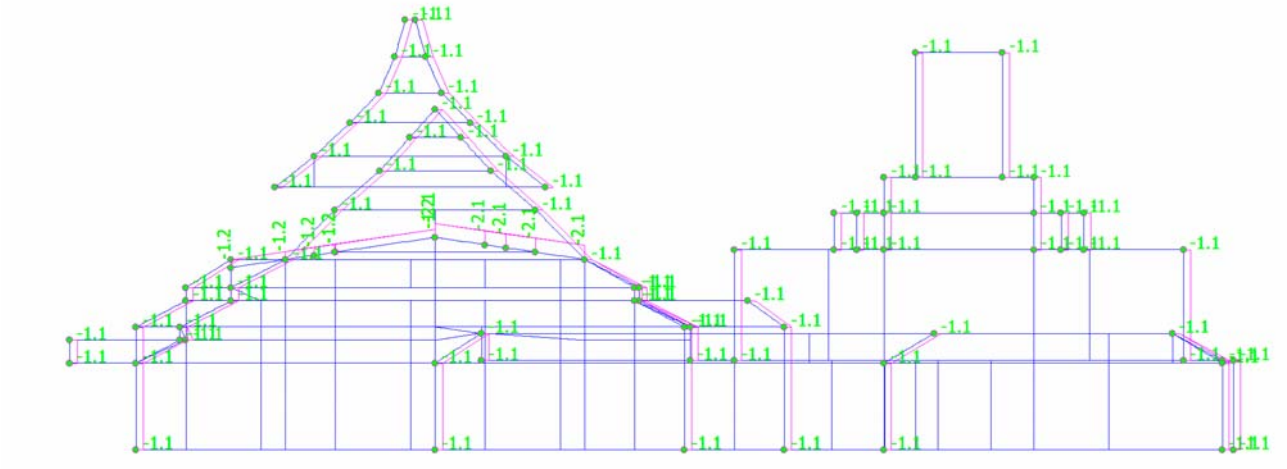
X 向风荷载简图 X Direction Wind Load Diagram



-X 向风荷载简图 -X Direction Wind Load Diagram



Y 向风荷载简图 Y Direction Wind Load Diagram



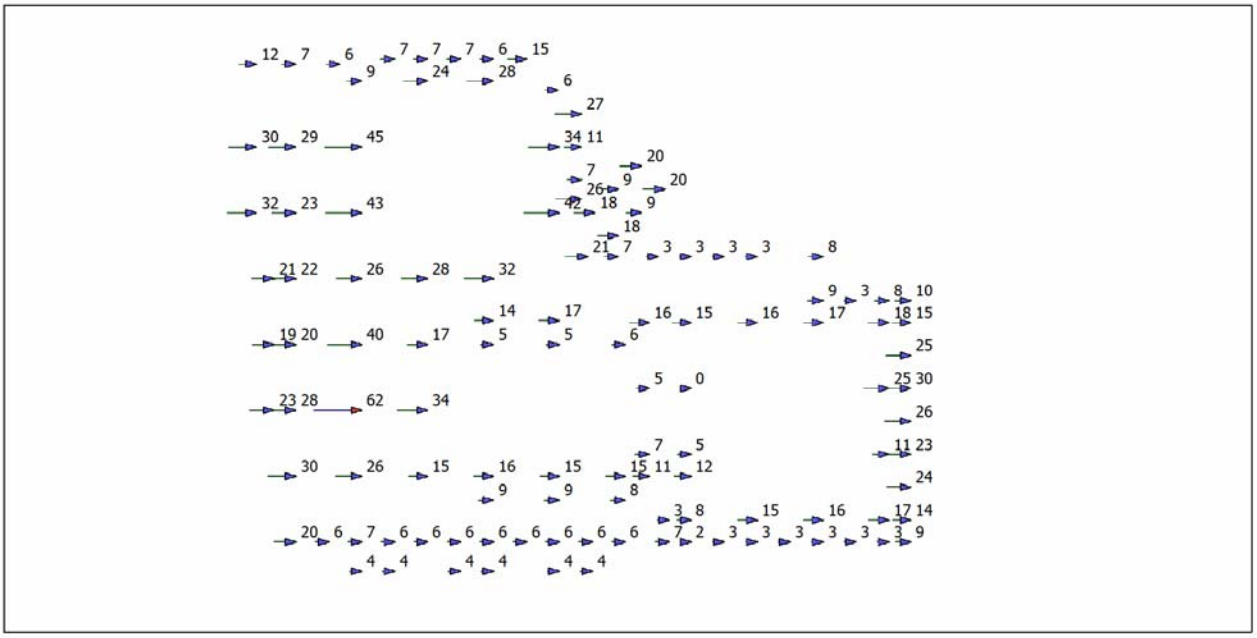
-Y 向风荷载简图 -Y Direction Wind Load Diagram

四 计算结果简图

Concludsion of Structure Calculation

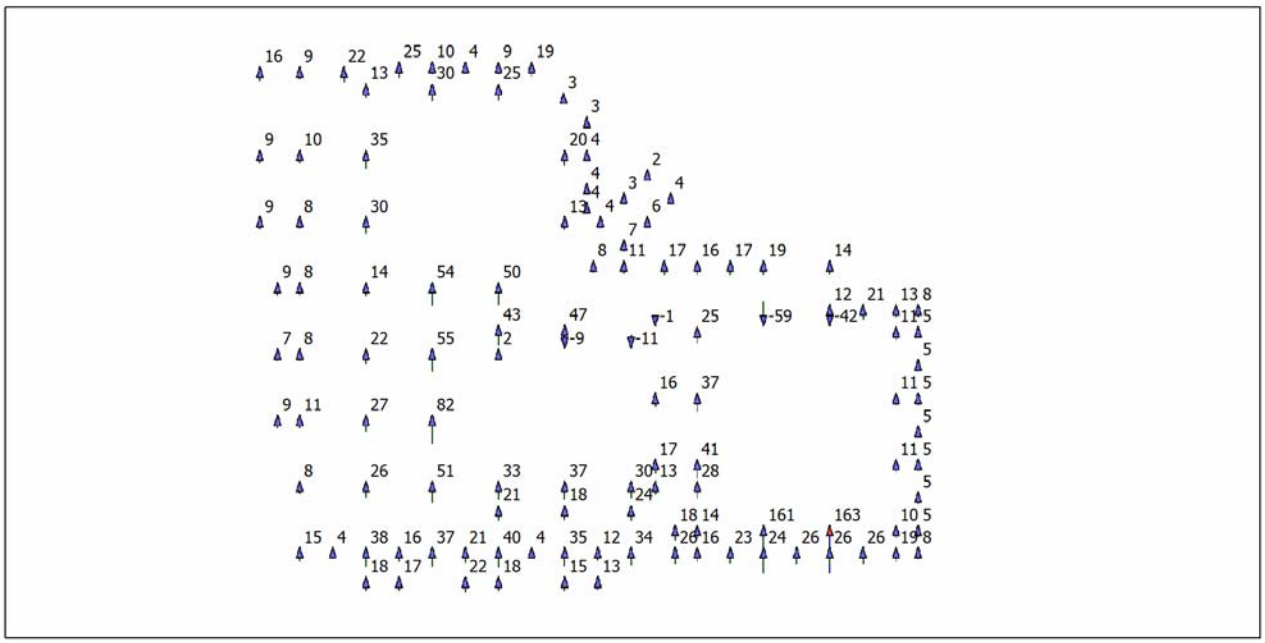
1、支座反力

Bearing Reaction



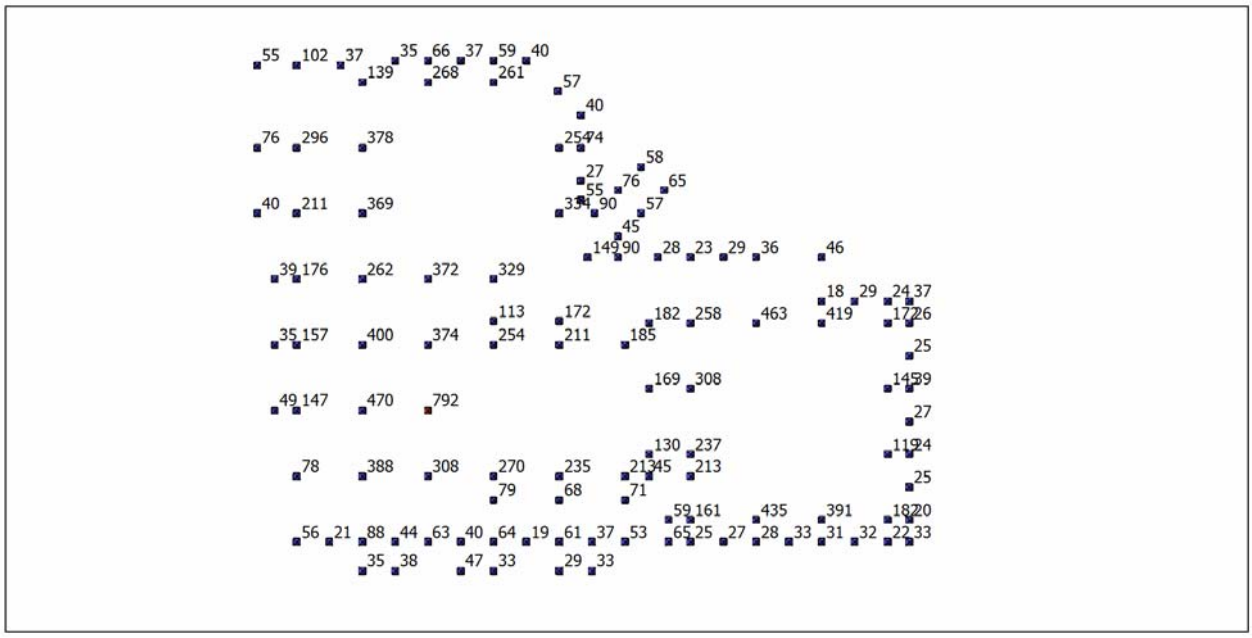
最不利设计组合工况下 X 向支座反力（剪力）简图（Midas 中考虑包络）

The most unfavorable combination of conditions designed to support the anti-X force (shear) diagram (Midas considered envelope)



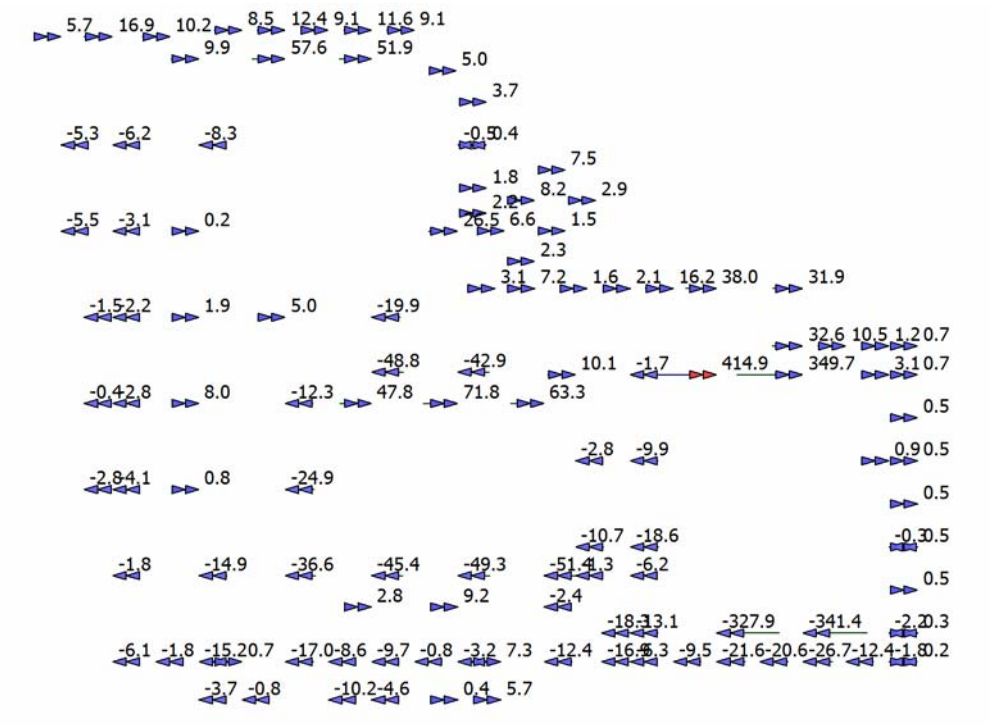
最不利设计组合工况下 Y 向支座反力（剪力）简图（Midas 中考虑包络）

The most unfavorable combination of conditions designed to support the anti-Y force (shear) diagram (Midas considered envelope)



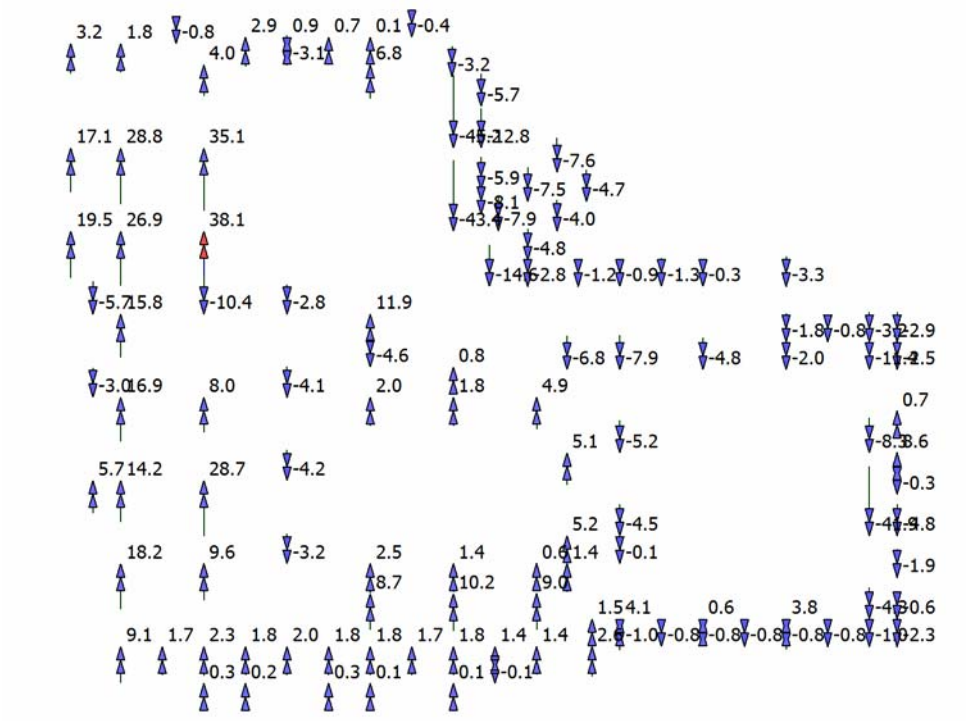
最不利设计组合工况下 Z 向支座反力（轴力）简图（Midas 中考虑包络）

The most unfavorable combination of conditions designed to support the anti-Z force (axial force) diagram (Midas consider envelope)



最不利设计组合工况下绕 X 向支座反力（弯矩）简图（Midas 中考虑包络）

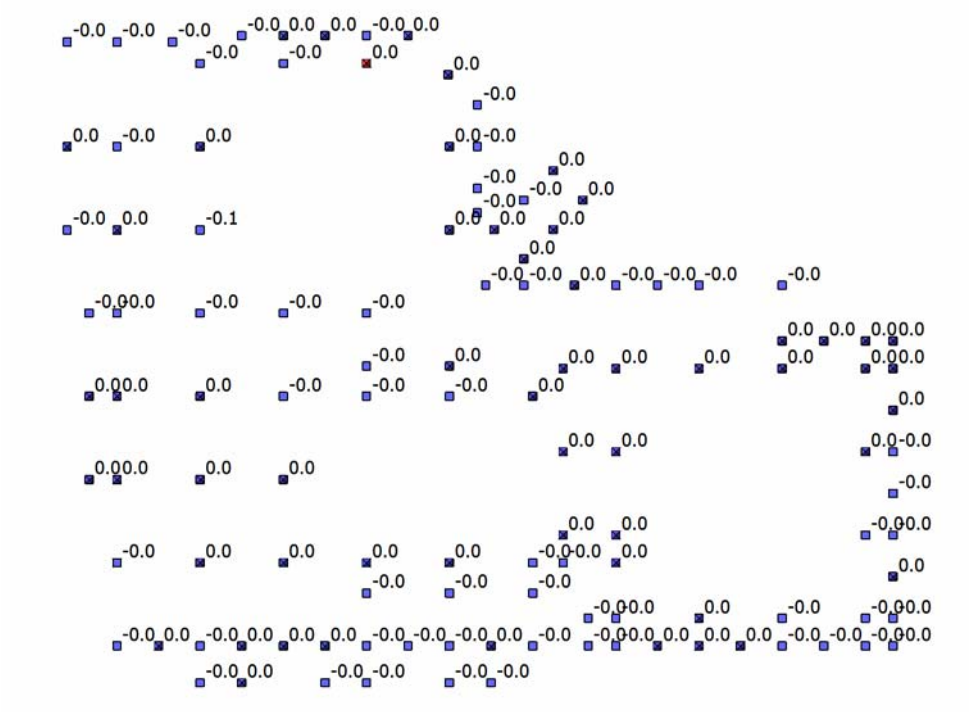
Design the most unfavorable combination of conditions around the X to the bearing reaction force (moment) diagram (Midas considered envelope)



最不利设计组合工况下绕 Y 向支座反力（弯矩）简图（Midas 中考虑包络）

Design the most unfavorable combination of conditions around the Y to the support reaction force (moment)

diagram (Midas considered envelope)

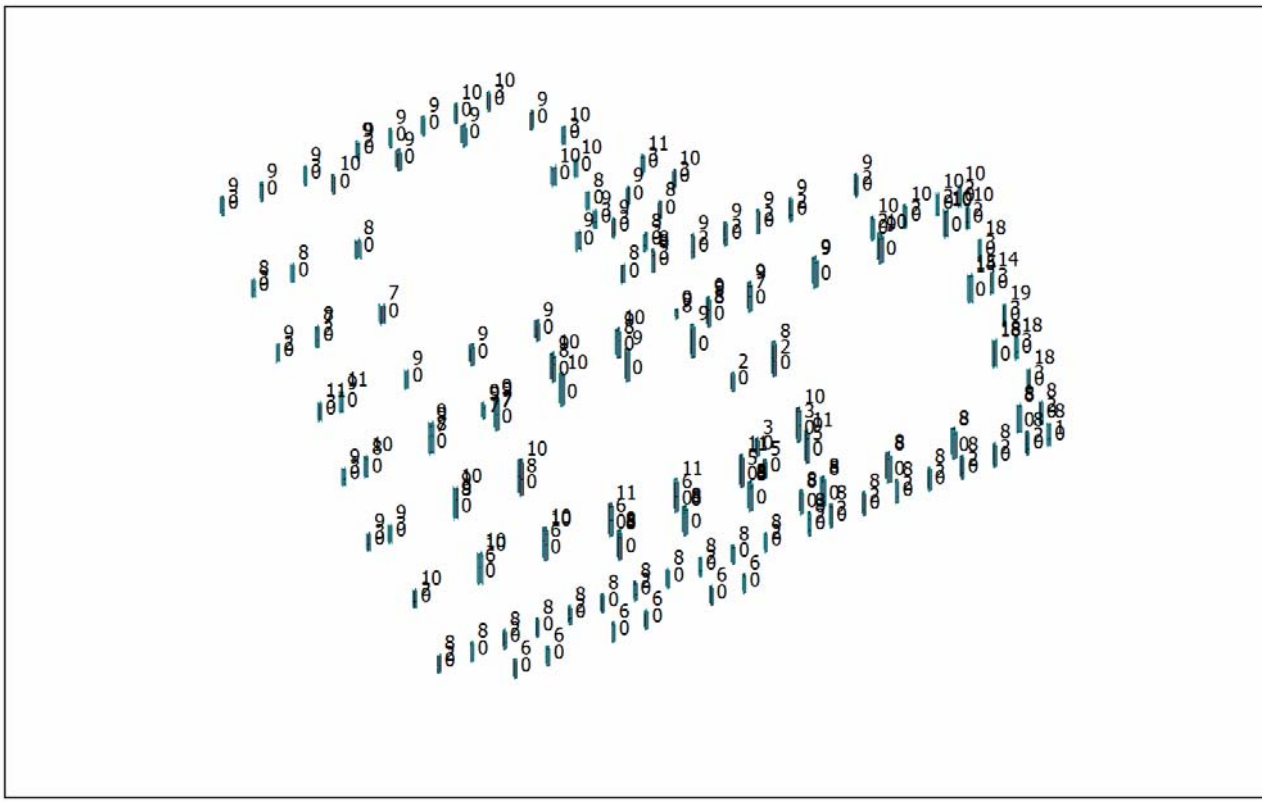


最不利设计组合工况下绕 Z 向支座反力（弯矩）简图（Midas 中考虑包络）

Design the most unfavorable combination of conditions around the Z to the support reaction force (moment) diagram (Midas considered envelope)

2、 位移

Displacement



最不利标准组合工况下 X 向位移简图

Standards for the most unfavorable combination of conditions to the displacement diagram X

位移最大值为 19mm

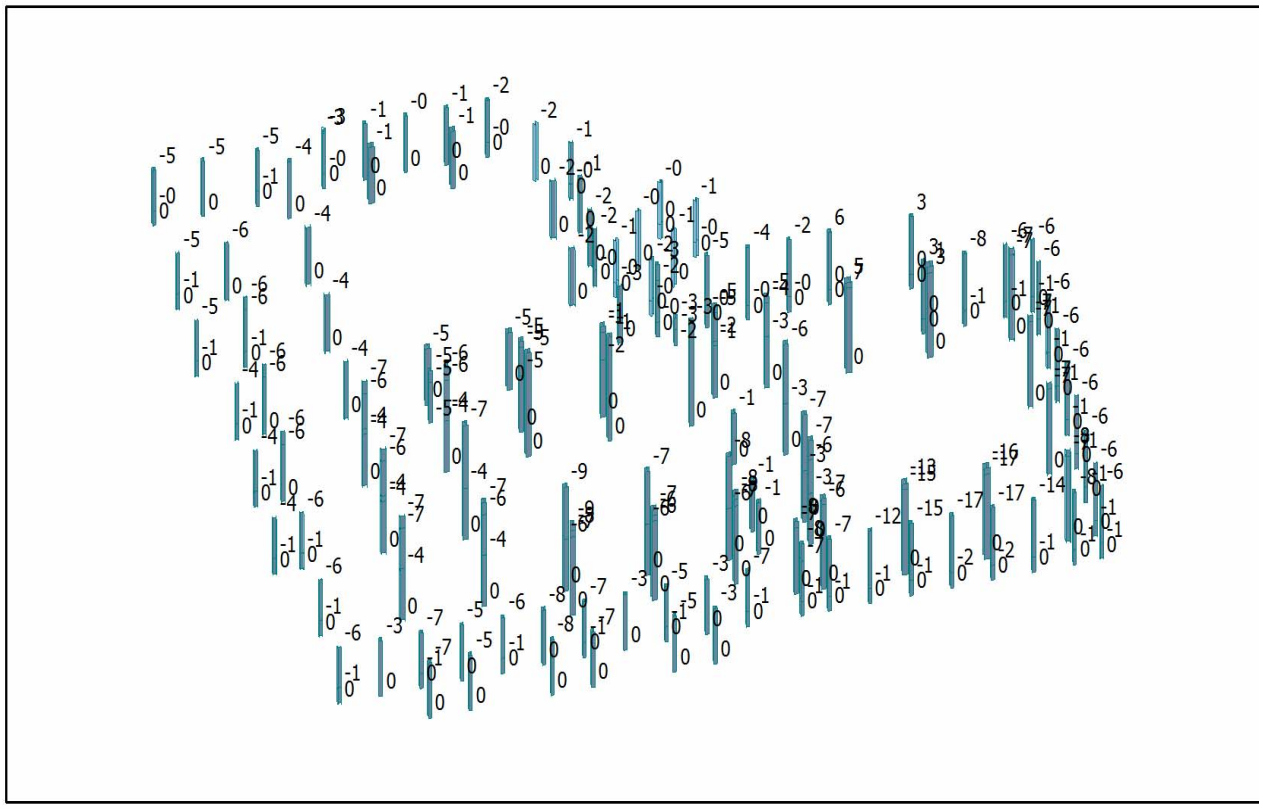
Maximum displacement is 19mm

此柱计算长度为 1300+ 4935=6235mm

Calculation the length of column for 1300 + 4935 = 6235mm

X 向层间位移角：19/6235=1/328 < [1/300]　　满足规范要求

X to the story drift angle: 19/6235 = 1 / 328 <[1 / 300] to meet the regulatory requirements



最不利标准组合工况下 Y 向位移简图

Standards for the most unfavorable combination of conditions to the displacement diagram Y

位移最大值为 17mm

Maximum displacement is 17mm

此柱计算长度为 1300+ 4935=6235mm

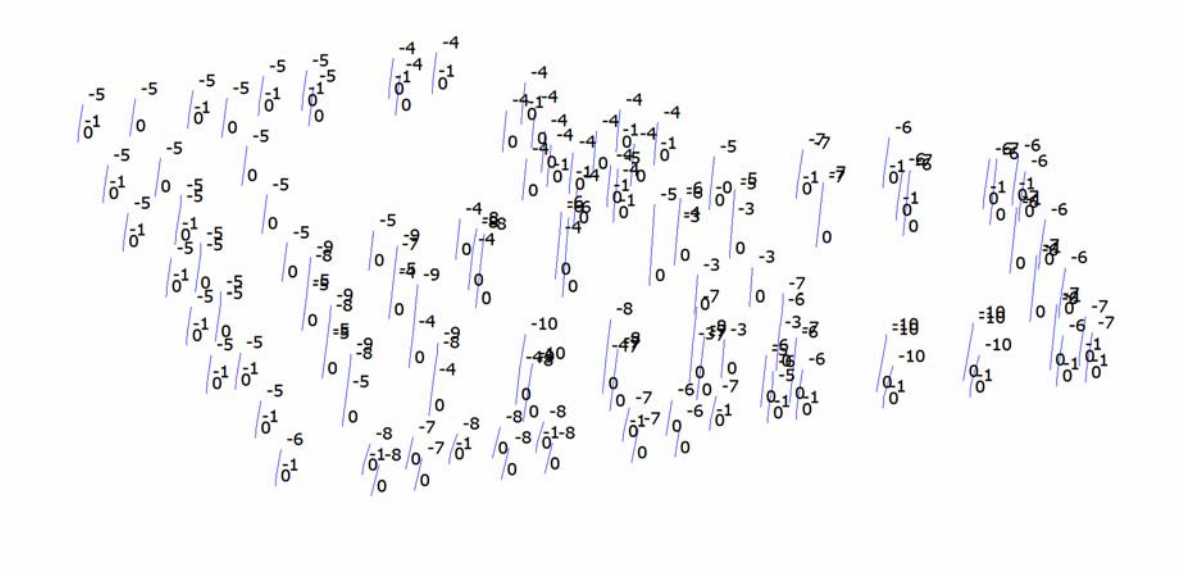
Calculation the length of column for 1300 + 4935 = 6235mm

X 向层间位移角：17/6235=1/366 < [1/300]　　满足规范要求

X to the story drift angle: 17/6235 = 1 / 366 <[1 / 300] to meet the regulatory requirements

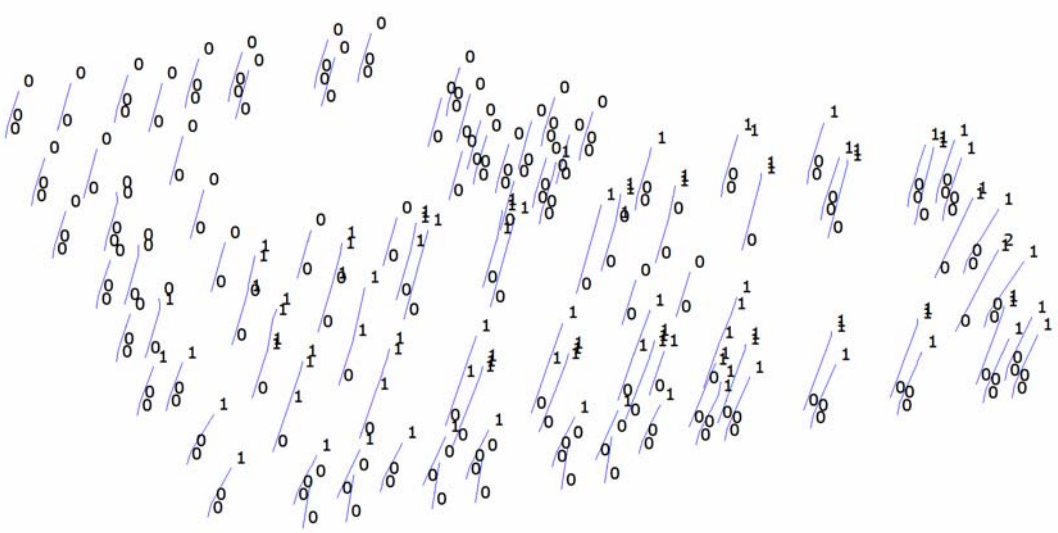
风载标准组合工况下 X 向位移简图

Combination of wind conditions contained in the standard displacement diagram X



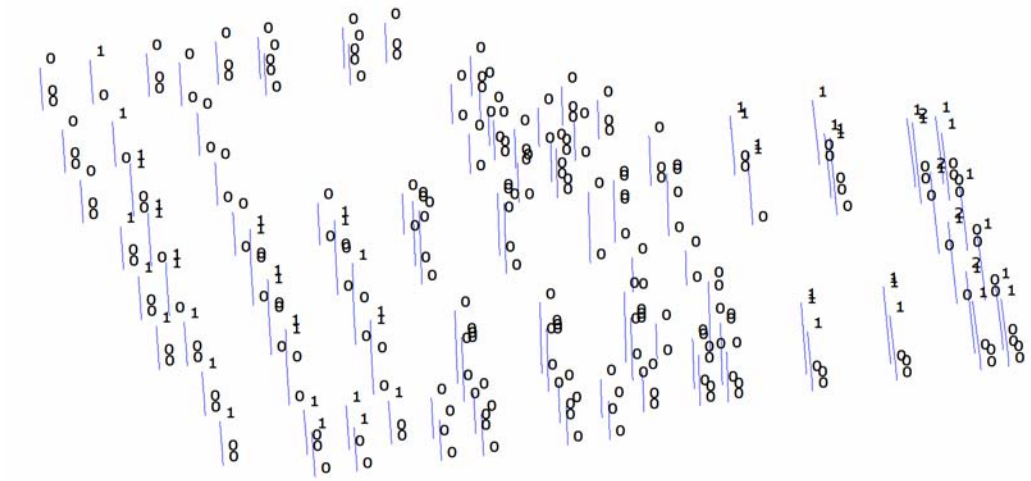
风载标准组合工况下 y 向位移简图

Standard combination of wind conditions y displacement diagram



地震作用标准组合工况下 x 向位移简图

The role of the standard combination of seismic displacement diagram condition x



地震作用标准组合工况下 y 向位移简图

The role of the standard combination of seismic displacement diagram condition y

3、 构件应力验算

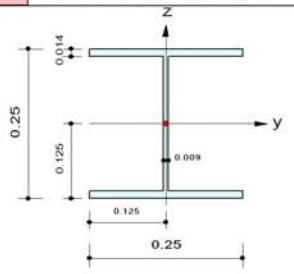
Component Stress Checking Calculation

KZ1 (HW 250x250x9x14)

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 33
材料 : Q345 (号:1)
(Fy = 345000, Es = 206000000)
截面名称 : HW 250x250x9/14 (号:2)
(型钢 : HW 250x250x9/14).
构件长度 : 4.86000



2. 截面内力

轴力 Fxx = -264.80 (LCB: 12, POS:I)
弯矩 My = 87.4771, Mz = 10.6430
端部弯矩 Myi = 87.4771, Myj = -75.736 (for Lb)
Myi = 87.4771, Myj = -75.736 (for Ly)
Mzi = 10.6430, Mzj = -7.6507 (for Lz)
剪力 Fyy = 11.1754 (LCB: 14, POS:I)
Fzz = 33.5829 (LCB: 12, POS:I)

高度	0.25000	腹板厚度	0.00900
上翼缘宽度	0.25000	上翼缘厚度	0.01400
下翼缘宽度	0.25000	下翼缘厚度	0.01400
面积	0.00922	Asz	0.00225
Qyb	0.05205	Qzb	0.00781
Iyy	0.00011	Izz	0.00004
Ybar	0.12500	Zbar	0.12500
Wyy	0.00087	Wzz	0.00029
ry	0.10800	rz	0.06290

3. 设计参数

自由长度 Ly = 4.86000, Lz = 4.86000, Lb = 4.86000
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 0.85, Beta_mz = 0.85

4. 强度验算结果

长细比

KL/r = 77.3 < 123.8 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 264.80/1705.72 = 0.155 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 87.477/268.770 = 0.325 < 1.000 ..... O.K
Mz/Mrz = 10.6430/90.5200 = 0.118 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax2 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')] + Eta*Beta_tz*Mz/(f*Phi_bz*W1z)
Rmax3 = N/(f*Phi_z*A) + Eta*Beta_ty*My/(f*Phi_by*W1y) + Beta_mz*Mz/[f*Gammaz*W1z*(1-0.8*N/N_Ez')]
Rmax = MAX[Rmax1, Rmax2, Rmax3] = 0.563 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.013 < 1.000 ..... O.K
Vz/Vrz = 0.090 < 1.000 ..... O.K

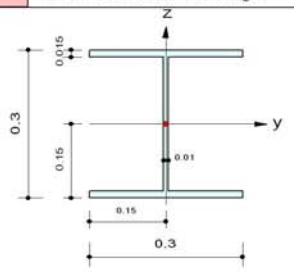
KZ2（HW300x300x10x15）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 2001
材料 : Q345 (号:1)
(Fy = 345000, Es = 206000000)
截面名称 : HW 300x300x10/15 (号:1)
(型钢 : HW 300x300x10/15).
构件长度 : 1.25000



2. 截面内力

轴力	Fxx = -246.98 (LCB: 14, POS:J)
弯矩	My = 51.1744, Mz = -97.387
端部弯矩	Myi = -6.2673, Myj = 51.1744 (for Lb)
	Myi = -6.2673, Myj = 51.1744 (for Ly)
	Mzi = 0.07402, Mzj = -97.387 (for Lz)
剪力	Fyy = 77.9685 (LCB: 14, POS:I)
	Fzz = -56.600 (LCB: 12, POS:I)

高度	0.30000	腹板厚度	0.01000
上翼缘宽度	0.30000	上翼缘厚度	0.01500
下翼缘宽度	0.30000	下翼缘厚度	0.01500
面积	0.01204	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00021	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wyy	0.00137	Wzz	0.00045
ry	0.13100	rz	0.07490

3. 设计参数

自由长度 Ly = 1.25000, Lz = 1.25000, Lb = 1.25000
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 0.85, Beta_mz = 0.85

4. 强度验算结果

长细比

KL/r = 16.7 < 123.8 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 246.98/3617.82 = 0.068 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 51.174/424.700 = 0.120 < 1.000 ..... O.K
Mz/Mrz = 97.387/139.500 = 0.698 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax2 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')] + Eta*Beta_tz*Mz/(f*Phi_bz*W1z)
Rmax3 = N/(f*Phi_z*A) + Eta*Beta_ty*My/(f*Phi_by*W1y) + Beta_mz*Mz/[f*Gammaz*W1z*(1-0.8*N/N_Ez')]
Rmax = MAX[Rmax1, Rmax2, Rmax3] = 0.763 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.072 < 1.000 ..... O.K
Vz/Vrz = 0.112 < 1.000 ..... O.K

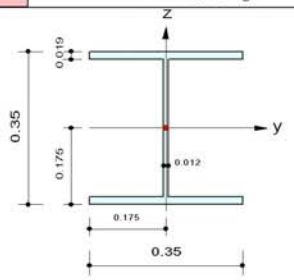
KZ3（HW 350x350x12x19）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 1371
材料 : Q345 (号:1)
(Fy = 325000, Es = 206000000)
截面名称 : HW 350x350x12/19 (号:19)
(型钢 : HW 350x350x12/19).
构件长度 : 8.89300



2. 截面内力

轴力 Fxx = -182.76 (LCB: 13, POS:I)
弯矩 My = 236.905, Mz = 2.97459
端部弯矩 Myi = 236.905, Myj = -175.00 (for Lb)
Myi = 236.905, Myj = -175.00 (for Ly)
Mzi = 2.97459, Mzj = -4.1995 (for Lz)
剪力 Fyy = 5.07193 (LCB: 12, POS:I)
Fzz = 46.3184 (LCB: 13, POS:I)

高度	0.35000	腹板厚度	0.01200
上翼缘宽度	0.35000	上翼缘厚度	0.01900
下翼缘宽度	0.35000	下翼缘厚度	0.01900
面积	0.01739	Asz	0.00420
Qyb	0.10388	Qzb	0.01531
Iyy	0.00040	Izz	0.00014
Ybar	0.17500	Zbar	0.17500
Wyy	0.00230	Wzz	0.00078
ry	0.15200	rz	0.08840

3. 设计参数

自由长度 Ly = 8.89300, Lz = 8.89300, Lb = 8.89300
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 0.85, Beta_mz = 0.85

4. 强度验算结果

长细比

KL/r = 100.6 < 123.8 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 182.76/2287.03 = 0.080 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 236.905/678.500 = 0.349 < 1.000 ..... O.K
Mz/Mrz = 2.975/228.920 = 0.013 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax2 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')] + Eta*Beta_tz*Mz/(f*Phi_bz*W1z)
Rmax3 = N/(f*Phi_z*A) + Eta*Beta_ty*My/(f*Phi_by*W1y) + Beta_mz*Mz/[f*Gammaz*W1z*(1-0.8*N/N_Ez')]
Rmax = MAX[Rmax1, Rmax2, Rmax3] = 0.484 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.003 < 1.000 ..... O.K
Vz/Vrz = 0.070 < 1.000 ..... O.K

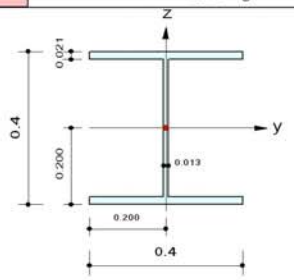
KZ4（HW 400x400x13x21）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 2197
材料 : Q345 (号:1)
(Fy = 325000, Es = 206000000)
截面名称 : HW 400x400x13/21 (号:18)
(型钢 : HW 400x400x13/21).
构件长度 : 4.44000



2. 截面内力

轴力 Fxx = -155.96 (LCB: 12, POS:J)
弯矩 My = 204.111, Mz = 80.0620
端部弯矩 Myi = 9.05389, Myj = 204.111 (for Lb)
Myi = 9.05389, Myj = 204.111 (for Ly)
Mzi = -74.317, Mzj = 80.0620 (for Lz)
剪力 Fyy = -34.770 (LCB: 12, POS:I)
Fzz = -65.608 (LCB: 14, POS:I)

高度	0.40000	腹板厚度	0.01300
上翼缘宽度	0.40000	上翼缘厚度	0.02100
下翼缘宽度	0.40000	下翼缘厚度	0.02100
面积	0.02195	Asz	0.00520
Qyb	0.13847	Qzb	0.02000
Iyy	0.00067	Izz	0.00022
Ybar	0.20000	Zbar	0.20000
Wyy	0.00334	Wzz	0.00112
ry	0.17500	rz	0.10100

3. 设计参数

自由长度 Ly = 4.44000, Lz = 4.44000, Lb = 4.44000
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 0.85, Beta_mz = 0.85

4. 强度验算结果

长细比

KL/r = 44.0 < 123.8 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 155.96/5494.30 = 0.028 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 204.111/985.300 = 0.207 < 1.000 ..... O.K
Mz/Mrz = 80.062/330.400 = 0.242 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax2 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')] + Eta*Beta_tz*Mz/(f*Phi_bz*W1z)
Rmax3 = N/(f*Phi_z*A) + Eta*Beta_ty*My/(f*Phi_by*W1y) + Beta_mz*Mz/[f*Gammaz*W1z*(1-0.8*N/N_Ez')]
Rmax = MAX[Rmax1, Rmax2, Rmax3] = 0.423 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.018 < 1.000 ..... O.K
Vz/Vrz = 0.080 < 1.000 ..... O.K

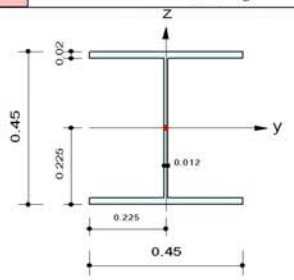
KZ5（HW 450x450x14x25）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 1683
材料 : Q345 (号:1)
(Fy = 325000, Es = 206000000)
截面名称 : HW 450x450x12/20 (号:3)
(组合截面).
构件长度 : 0.50500



2. 截面内力

轴力 Fxx = -461.11 (LCB: 13, POS:I)
弯矩 My = 951.525, Mz = -15.046
端部弯矩 Myi = 951.525, Myj = 837.655 (for Lb)
Myi = 951.525, Myj = 837.655 (for Ly)
Mzi = -15.046, Mzj = -17.392 (for Lz)
剪力 Fyy = -26.324 (LCB: 14, POS:I)
Fzz = 225.486 (LCB: 13, POS:I)

高度	0.45000	腹板厚度	0.01200
上翼缘宽度	0.45000	上翼缘厚度	0.02000
下翼缘宽度	0.45000	下翼缘厚度	0.02000
面积	0.02292	Asz	0.00540
Qyb	0.18226	Qzb	0.02531
Iyy	0.00090	Izz	0.00030
Ybar	0.22500	Zbar	0.22500
Wyy	0.00401	Wzz	0.00135
ry	0.19833	rz	0.11513

3. 设计参数

自由长度 Ly = 0.50500, Lz = 0.50500, Lb = 0.50500
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 0.85, Beta_mz = 0.85

4. 强度验算结果

长细比

KL/r = 4.4 < 123.8 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 461.11/6654.11 = 0.069 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 951.53/1163.08 = 0.818 < 1.000 ..... O.K
Mz/Mrz = 15.046/384.601 = 0.039 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax2 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')] + Eta*Beta_tz*Mz/(f*Phi_bz*W1z)
Rmax3 = N/(f*Phi_z*A) + Eta*Beta_ty*My/(f*Phi_by*W1y) + Beta_mz*Mz/[f*Gammaz*W1z*(1-0.8*N/N_Ez')]
Rmax = MAX[Rmax1, Rmax2, Rmax3] = 0.881 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.013 < 1.000 ..... O.K
Vz/Vrz = 0.268 < 1.000 ..... O.K

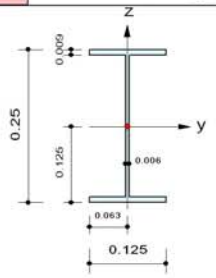
GL1（HN 250x125x6x9）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 1370
材料 : Q345 (号:1)
(Fy = 345000, Es = 206000000)
截面名称 : HN 250x125x6/9 (号:16)
(组合截面).
构件长度 : 2.45511



2. 截面内力

轴力 Fxx = 14.2597 (LCB: 14, POS:I)
弯矩 My = -53.449, Mz = -1.3826
端部弯矩 Myi = -53.449, Myj = 25.3836 (for Lb)
Myi = -53.449, Myj = 25.3836 (for Ly)
Mzi = -1.3826, Mzj = 1.19487 (for Lz)
剪力 Fyy = -1.0498 (LCB: 14, POS:I)
Fzz = -32.495 (LCB: 14, POS:I)

高度	0.25000	腹板厚度	0.00600
上翼缘宽度	0.12500	上翼缘厚度	0.00900
下翼缘宽度	0.12500	下翼缘厚度	0.00900
面积	0.00364	Asz	0.00150
Qyb	0.02932	Qzb	0.00195
Iyy	0.00004	Izz	0.00000
Ybar	0.06250	Zbar	0.12500
Wyy	0.00031	Wzz	0.00005
ry	0.10339	rz	0.02838

3. 设计参数

自由长度 Ly = 2.45511, Lz = 2.45511, Lb = 2.45511
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 1.00, Beta_mz = 1.00

4. 强度验算结果

长细比
L/r = 86.5 < 165.1 (LCB: 15)..... O.K
轴向应力验算
N/Nrt = 14.26/1129.02 = 0.013 < 1.000 ..... O.K
弯曲应力验算
My/Mry = 53.4489/96.5447 = 0.554 < 1.000 ..... O.K
Mz/Mrz = 1.3826/14.5520 = 0.095 < 1.000 ..... O.K
整体稳定验算 (张拉+弯曲)
Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax = Rmax1 = 0.619 < 1.000 ..... O.K
剪切强度验算
Vy/Vry = 0.004 < 1.000 ..... O.K
Vz/Vrz = 0.136 < 1.000 ..... O.K

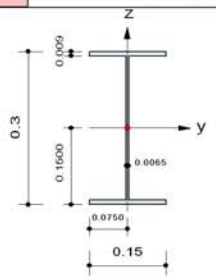
GL2（HN 300x150x6.5x9）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 2682
材料 : Q345 (号:1)
(Fy = 345000, Es = 206000000)
截面名称 : HN 300x150x6.5x9 (号:9)
(组合截面).
构件长度 : 3.00000



2. 截面内力

轴力 Fxx = -21.114 (LCB: 11, POS:J)
弯矩 My = -9.2334, Mz = -1.3806
端部弯矩 Myi = 2.98592, Myj = -9.2334 (for Lb)
Myi = 2.98592, Myj = -9.2334 (for Ly)
Mzi = 1.93080, Mzj = -1.3806 (for Lz)
剪力 Fyy = 1.10380 (LCB: 11, POS:I)
Fzz = -11.807 (LCB: 12, POS:I)

高度	0.30000	腹板厚度	0.00650
上翼缘宽度	0.15000	上翼缘厚度	0.00900
下翼缘宽度	0.15000	下翼缘厚度	0.00900
面积	0.00453	Asz	0.00195
Qyb	0.04016	Qzb	0.00281
Iyy	0.00007	Izz	0.00001
Ybar	0.07500	Zbar	0.15000
Wyy	0.00046	Wzz	0.00007
ry	0.12367	rz	0.03344

3. 设计参数

自由长度 Ly = 3.00000, Lz = 3.00000, Lb = 3.00000
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 1.00, Beta_mz = 1.00

4. 强度验算结果

长细比

KL/r = 89.7 < 123.8 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 21.114/589.828 = 0.036 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 9.233/143.272 = 0.064 < 1.000 ..... O.K
Mz/Mrz = 1.3806/20.9517 = 0.066 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax2 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')] + Eta*Beta_tz*Mz/(f*Phi_bz*W1z)
Rmax3 = N/(f*Phi_z*A) + Eta*Beta_ty*My/(f*Phi_by*W1y) + Beta_mz*Mz/[f*Gammaz*W1z*(1-0.8*N/N_Ez')]
Rmax = MAX[Rmax1, Rmax2, Rmax3] = 0.174 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.003 < 1.000 ..... O.K
Vz/Vrz = 0.038 < 1.000 ..... O.K

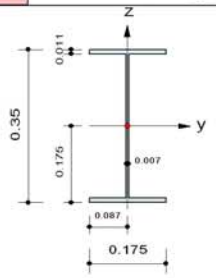
GL3（HN 350x175x7x11）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 94
材料 : Q345 (号:1)
(Fy = 345000, Es = 206000000)
截面名称 : HN 350x175x7/11 (号:6)
(组合截面).
构件长度 : 6.00000



2. 截面内力

轴力 Fxx = -0.8348 (LCB: 1, POS:1/2)
弯矩 My = 76.0169, Mz = 0.00000
端部弯矩 Myi = 0.00000, Myj = 0.00000 (for Lb)
Myi = 0.00000, Myj = 0.00000 (for Ly)
Mzi = 0.00000, Mzj = 0.00000 (for Lz)
剪力 Fyy = 0.00000 (LCB: 16, POS:I)
Fzz = -50.678 (LCB: 1, POS:I)

高度	0.35000	腹板厚度	0.00700
上翼缘宽度	0.17500	上翼缘厚度	0.01100
下翼缘宽度	0.17500	下翼缘厚度	0.01100
面积	0.00615	Asz	0.00245
Qyb	0.06006	Qzb	0.00383
Iyy	0.00013	Izz	0.00001
Ybar	0.08750	Zbar	0.17500
Wyy	0.00075	Wzz	0.00011
ry	0.14613	rz	0.04000

3. 设计参数

自由长度 Ly = 6.00000, Lz = 6.00000, Lb = 6.00000
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 1.00, Beta_mz = 1.00

4. 强度验算结果

长细比

KL/r = 150.0 < 165.1 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 0.835/390.761 = 0.002 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 76.017/232.473 = 0.327 < 1.000 ..... O.K
Mz/Mrz = 0.0000/34.8436 = 0.000 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')]
Rmax2 = N/(f*Phi_z*A) + Eta*Beta_ty*My/(f*Phi_b*W1y)
Rmax = MAX[Rmax1, Rmax2] = 0.719 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.000 < 1.000 ..... O.K
Vz/Vrz = 0.129 < 1.000 ..... O.K

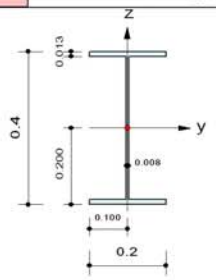
GL4（HN 400x200x8x13）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 119
材料 : Q345 (号:1)
(Fy = 345000, Es = 206000000)
截面名称 : HN 400x200x8/13 (号:12)
(型钢 : HN 400x200x8/13).
构件长度 : 6.00000



2. 截面内力

轴力 Fxx = -25.465 (LCB: 11, POS:J)
弯矩 My = -118.85, Mz = -3.2787
端部弯矩 Myi = 40.9667, Myj = -118.85 (for Lb)
Myi = 0.19258, Myj = -118.85 (for Ly)
Mzi = 1.24268, Mzj = -3.2787 (for Lz)
剪力 Fyy = 3.81260 (LCB: 14, POS:3/4)
Fzz = 87.1919 (LCB: 11, POS:J)

高度	0.40000	腹板厚度	0.00800
上翼缘宽度	0.20000	上翼缘厚度	0.01300
下翼缘宽度	0.20000	下翼缘厚度	0.01300
面积	0.00841	Asz	0.00320
Qyb	0.08037	Qzb	0.00500
Iyy	0.00024	Izz	0.00002
Ybar	0.10000	Zbar	0.20000
Wyy	0.00119	Wzz	0.00017
ry	0.16800	rz	0.04540

3. 设计参数

自由长度 Ly = 6.00000, Lz = 2.00000, Lb = 2.00000
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 1.00, Beta_mz = 1.00

4. 强度验算结果

长细比

KL/r = 44.1 < 123.8 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 25.47/2192.00 = 0.012 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 118.853/368.900 = 0.322 < 1.000 ..... O.K
Mz/Mrz = 3.2787/53.9400 = 0.061 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax2 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')] + Eta*Beta_tz*Mz/(f*Phi_bz*W1z)
Rmax3 = N/(f*Phi_z*A) + Eta*Beta_ty*My/(f*Phi_by*W1y) + Beta_mz*Mz/[f*Gammaz*W1z*(1-0.8*N/N_Ez')]
Rmax = MAX[Rmax1, Rmax2, Rmax3] = 0.383 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.006 < 1.000 ..... O.K
Vz/Vrz = 0.164 < 1.000 ..... O.K

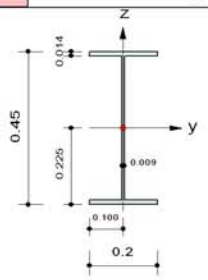
GL5（HN 450x200x9x14）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 1791
材料 : Q345 (号:1)
(Fy = 345000, Es = 206000000)
截面名称 : HN 450x200x9/14 (号:4)
(型钢 : HN 450x200x9/14).
构件长度 : 2.00000



2. 截面内力

轴力 Fxx = 241.661 (LCB: 12, POS:J)
弯矩 My = 41.9707, Mz = -50.162
端部弯矩 Myi = 14.6633, Myj = 41.9707 (for Lb)
Myi = 14.6633, Myj = 41.9707 (for Ly)
Mzi = 21.9476, Mzj = -50.162 (for Lz)
剪力 Fyy = 36.0546 (LCB: 12, POS:I)
Fzz = -46.367 (LCB: 13, POS:I)

高度	0.45000	腹板厚度	0.00900
上翼缘宽度	0.20000	上翼缘厚度	0.01400
下翼缘宽度	0.20000	下翼缘厚度	0.01400
面积	0.00974	Asz	0.00405
Qyb	0.09008	Qzb	0.00500
Iyy	0.00034	Izz	0.00002
Ybar	0.10000	Zbar	0.22500
Wyy	0.00150	Wzz	0.00019
ry	0.18600	rz	0.04380

3. 设计参数

自由长度 Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 1.00, Beta_mz = 1.00

4. 强度验算结果

长细比
L/r = 45.7 < 165.1 (LCB: 15)..... O.K
轴向应力验算
N/Nrt = 241.66/3019.71 = 0.080 < 1.000 ..... O.K
弯曲应力验算
My/Mry = 41.971/465.000 = 0.090 < 1.000 ..... O.K
Mz/Mrz = 50.1617/57.9700 = 0.865 < 1.000 ..... O.K
整体稳定验算 (张拉+弯曲)
Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax = Rmax1 = 0.887 < 1.000 ..... O.K
剪切强度验算
Vy/Vry = 0.054 < 1.000 ..... O.K
Vz/Vrz = 0.069 < 1.000 ..... O.K

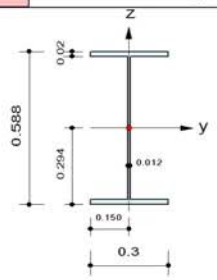
GL7（HN 588x300x12x20）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 2222
材料 : Q345 (号:1)
(Fy = 325000, Es = 206000000)
截面名称 : HM 588x300x12/20 (号:17)
(型钢 : HM 588x300x12/20).
构件长度 : 18.0000



2. 截面内力

轴力 Fxx = -78.443 (LCB: 11, POS:J)
弯矩 My = -295.07, Mz = -6.7449
端部弯矩 Myi = 225.239, Myj = -295.07 (for Lb)
Myi = 225.239, Myj = -295.07 (for Ly)
Mzi = 2.45010, Mzj = -6.7449 (for Lz)
剪力 Fyy = 5.31045 (LCB: 8, POS:1/4)
Fzz = 150.538 (LCB: 7, POS:J)

高度	0.58800	腹板厚度	0.01200
上翼缘宽度	0.30000	上翼缘厚度	0.02000
下翼缘宽度	0.30000	下翼缘厚度	0.02000
面积	0.01925	Asz	0.00706
Qyb	0.17954	Qzb	0.01125
Iyy	0.00118	Izz	0.00009
Ybar	0.15000	Zbar	0.29400
Wyy	0.00402	Wzz	0.00060
ry	0.24800	rz	0.06850

3. 设计参数

自由长度 Ly = 4.00000, Lz = 4.00000, Lb = 4.00000
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 1.00, Beta_mz = 1.00

4. 强度验算结果

长细比

L/r = 87.6 < 165.1 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 78.44/4308.61 = 0.018 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 295.07/1185.90 = 0.249 < 1.000 ..... O.K
Mz/Mrz = 6.745/177.295 = 0.038 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax2 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')] + Eta*Beta_tz*Mz/(f*Phi_bz*W1z)
Rmax3 = N/(f*Phi_z*A) + Eta*Beta_ty*My/(f*Phi_by*W1y) + Beta_mz*Mz/[f*Gammaz*W1z*(1-0.8*N/N_Ez')]
Rmax = MAX[Rmax1, Rmax2, Rmax3] = 0.309 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.004 < 1.000 ..... O.K
Vz/Vrz = 0.135 < 1.000 ..... O.K

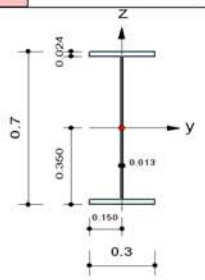
GL8（HN 700x300x13x24）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 1824
材料 : Q345 (号:1)
(Fy = 325000, Es = 206000000)
截面名称 : HN 700x300x13/24 (号:11)
(型钢 : HN 700x300x13/24).
构件长度 : 8.36272



2. 截面内力

轴力 Fxx = -298.64 (LCB: 13, POS:J)
弯矩 My = -1.1552, Mz = 175.359
端部弯矩 Myi = 139.701, Myj = -1.1552 (for Lb)
Myi = 529.381, Myj = -1.1552 (for Ly)
Mzi = -67.422, Mzj = 175.359 (for Lz)
剪力 Fyy = -105.71 (LCB: 13, POS:3/4)
Fzz = 104.294 (LCB: 13, POS:1/2)

高度	0.70000	腹板厚度	0.01300
上翼缘宽度	0.30000	上翼缘厚度	0.02400
下翼缘宽度	0.30000	下翼缘厚度	0.02400
面积	0.02355	Asz	0.00910
Qyb	0.24034	Qzb	0.01125
Iyy	0.00201	Izz	0.00011
Ybar	0.15000	Zbar	0.35000
Wyy	0.00576	Wzz	0.00072
ry	0.29300	rz	0.06780

3. 设计参数

自由长度 Ly = 8.36272, Lz = 2.29678, Lb = 2.29678
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 1.00, Beta_mz = 1.00

4. 强度验算结果

长细比

KL/r = 47.0 < 123.8 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 298.64/5363.05 = 0.056 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 1.16/1632.43 = 0.001 < 1.000 ..... O.K
Mz/Mrz = 175.359/212.561 = 0.825 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax2 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')] + Eta*Beta_tz*Mz/(f*Phi_bz*W1z)
Rmax3 = N/(f*Phi_z*A) + Eta*Beta_ty*My/(f*Phi_by*W1y) + Beta_mz*Mz/[f*Gammaz*W1z*(1-0.8*N/N_Ez')]
Rmax = MAX[Rmax1, Rmax2, Rmax3] = 0.878 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.065 < 1.000 ..... O.K
Vz/Vrz = 0.073 < 1.000 ..... O.K

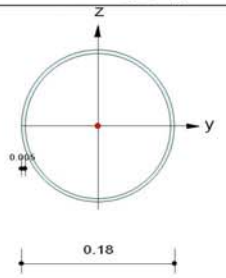
GL9（圆管 180x5）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 769
材料 : Q345 (号:1)
(Fy = 345000, Es = 206000000)
截面名称 : P 180x5 (号:20)
(型钢 : P 180x5).
构件长度 : 6.00000



2. 截面内力

轴力	Fxx = -35.946 (LCB: 12, POS:1/2)
弯矩	My = 1.19987, Mz = 0.00000
端部弯矩	Myi = 0.00000, Myj = 0.00000 (for Lb)
	Myi = 0.00000, Myj = 0.00000 (for Ly)
	Mzi = 0.00000, Mzj = 0.00000 (for Lz)
剪力	Fyy = 0.00000 (LCB: 16, POS:I)
	Fzz = -0.8999 (LCB: 1, POS:I)

外径	0.18000	壁厚	0.00500
面积	0.00275	Asz	0.00137
Qyb	0.00766	Qzb	0.00766
Iyy	0.00001	Izz	0.00001
Ybar	0.09000	Zbar	0.09000
Wyy	0.00012	Wzz	0.00012
ry	0.06190	rz	0.06190

3. 设计参数

自由长度 Ly = 6.00000, Lz = 6.00000, Lb = 6.00000
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 1.00, Beta_mz = 1.00

4. 强度验算结果

长细比

KL/r = 96.9 < 123.8 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 35.946/435.242 = 0.083 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 1.1999/36.2762 = 0.033 < 1.000 ..... O.K
Mz/Mrz = 0.0000/36.2762 = 0.000 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')]
Rmax = Rmax1 = 0.113 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.000 < 1.000 ..... O.K
Vz/Vrz = 0.004 < 1.000 ..... O.K

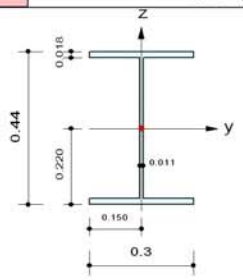
GL10 (HM 440x300x11x18)

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 1400
材料 : Q345 (号:1)
(Fy = 325000, Es = 206000000)
截面名称 : HM 440x300x11/18 (号:5)
(型钢 : HM 440x300x11/18).
构件长度 : 6.06594



2. 截面内力

轴力 Fxx = -33.680 (LCB: 14, POS:I)
弯矩 My = 284.819, Mz = 0.08279
端部弯矩 Myi = 284.819, Myj = -261.67 (for Lb)
Myi = 284.819, Myj = -261.67 (for Ly)
Mzi = 0.08279, Mzj = -1.9686 (for Lz)
剪力 Fyy = 0.57069 (LCB: 13, POS:I)
Fzz = 131.860 (LCB: 14, POS:J)

高度	0.44000	腹板厚度	0.01100
上翼缘宽度	0.30000	上翼缘厚度	0.01800
下翼缘宽度	0.30000	下翼缘厚度	0.01800
面积	0.01574	Asz	0.00484
Qyb	0.12398	Qzb	0.01125
Iyy	0.00056	Izz	0.00008
Ybar	0.15000	Zbar	0.22000
Wyy	0.00255	Wzz	0.00054
ry	0.18900	rz	0.07180

3. 设计参数

自由长度 Ly = 6.06594, Lz = 6.06594, Lb = 6.06594
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 1.00, Beta_mz = 1.00

4. 强度验算结果

长细比

KL/r = 84.5 < 123.8 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 33.68/2596.30 = 0.013 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 284.819/752.250 = 0.379 < 1.000 ..... O.K
Mz/Mrz = 0.083/159.595 = 0.001 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax2 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')] + Eta*Beta_tz*Mz/(f*Phi_bz*W1z)
Rmax3 = N/(f*Phi_z*A) + Eta*Beta_ty*My/(f*Phi_by*W1y) + Beta_mz*Mz/[f*Gammaz*W1z*(1-0.8*N/N_Ez')]
Rmax = MAX[Rmax1, Rmax2, Rmax3] = 0.461 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.000 < 1.000 ..... O.K
Vz/Vrz = 0.171 < 1.000 ..... O.K

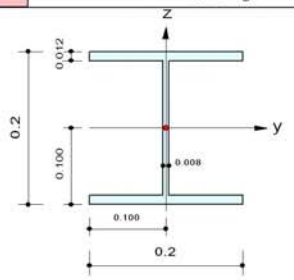
LZ1、2（HW 200x200x8x12）

midas Gen **Steel Checking Result**

Company		Project Title	
Author		File Name	E:\...\2009.04.17模型.mgb

1. 设计条件

设计规范 : GB50017-03
单位体系 : kN, m
单元号 : 2330
材料 : Q345 (号:1)
(Fy = 345000, Es = 206000000)
截面名称 : HW 200x200x8/12 (号:7)
(型钢 : HW 200x200x8/12).
构件长度 : 1.48000



2. 截面内力

轴力 Fxx = -1.9781 (LCB: 1, POS:I)
弯矩 My = 13.4223, Mz = -10.397
端部弯矩 Myi = 13.4223, Myj = -0.0050 (for Lb)
Myi = 13.4223, Myj = -0.0050 (for Ly)
Mzi = -10.397, Mzj = 0.00624 (for Lz)
剪力 Fyy = -7.0291 (LCB: 1, POS:I)
Fzz = 9.11440 (LCB: 7, POS:I)

高度	0.20000	腹板厚度	0.00800
上翼缘宽度	0.20000	上翼缘厚度	0.01200
下翼缘宽度	0.20000	下翼缘厚度	0.01200
面积	0.00643	Asz	0.00160
Qyb	0.03207	Qzb	0.00500
Iyy	0.00005	Izz	0.00002
Ybar	0.10000	Zbar	0.10000
Wyy	0.00048	Wzz	0.00016
ry	0.08610	rz	0.04990

3. 设计参数

自由长度 Ly = 1.48000, Lz = 1.48000, Lb = 1.48000
计算长度系数 Ky = 1.00, Kz = 1.00
等效弯矩系数 Beta_my = 0.85, Beta_mz = 0.85

4. 强度验算结果

长细比

KL/r = 29.7 < 123.8 (LCB: 15)..... O.K

轴向应力验算

N/Nrc = 1.98/1821.97 = 0.001 < 1.000 ..... O.K

弯曲应力验算

My/Mry = 13.422/147.870 = 0.091 < 1.000 ..... O.K
Mz/Mrz = 10.3968/49.6000 = 0.210 < 1.000 ..... O.K

整体稳定验算 (压缩+弯曲)

Rmax1 = N/(f*An) + My/(f*Gammay*Wny) + Mz/(f*Gammaz*Wnz)
Rmax2 = N/(f*Phi_y*A) + Beta_my*My/[f*Gammay*W1y*(1-0.8*N/N_Ey')] + Eta*Beta_tz*Mz/(f*Phi_bz*W1z)
Rmax3 = N/(f*Phi_z*A) + Eta*Beta_ty*My/(f*Phi_by*W1y) + Beta_mz*Mz/[f*Gammaz*W1z*(1-0.8*N/N_Ez')]
Rmax = MAX[Rmax1, Rmax2, Rmax3] = 0.262 < 1.000 ..... O.K

剪切强度验算

Vy/Vry = 0.012 < 1.000 ..... O.K
Vz/Vrz = 0.034 < 1.000 ..... O.K

五　基础计算书

Foundation Calculation

2 米宽条形基础设计

2 meter width Strip Foundation Design

1．已知条件

Condition

柱底竖向力（每延米）:（59+161+435+391+182）/20=61.40 kN/m

Column at the end of the vertical force (every extended meter): (59 +161 +435 +391 +182) / 20 = 61.40 kN / m

柱底弯矩（每延米）:（18+13+328+341+2.2）/20=35.11 kN.m/m

Column at the end of bending moment (every entend meter): (18 +13 +328 +341 +2.2) / 20 = 35.11 kN.m / m

混凝土等级：C30　受力筋级别：HRB335　　保护层厚度：40

Concrete grade C30　Deformed Bar: HRB335　　Protection layer: 40

2.反力计算：

Reaction Calculation

(1) 荷载标准值时基底全反力 - 用于验算地基承载力

Basic load standard for all force- for checking the bearing capacity of foundation

pk=(Fk+Gk)/A = 48.24 kPa

pKmax = (Fk+Gk)/A + Mk/W = 56.43 kPa

pKmin = (Fk+Gk)/A - Mk/W = 40.05 kPa

(2) 荷载设计值时基底全反力

Basic design Load for all force

p = (F + G)/A = 65.13 kPa

pmax = (F + G)/A + M/W = 76.18 kPa

pmin = (F + G)/A - M/W = 54.07 kPa

(3) 荷载设计值时基底净反力 - 用于验算基础剪切和冲切承载力

Basic design Load at foundation base reaction force- the basis for checking and punching shear capacity

pj = F/A = 30.70 kPa

pmaxj = pmax - G/A = 41.75 kPa

pminj = pmin - G/A = 19.65 kPa

3.地基承载力验算：

Checking Bearing Capacity of Foundation

偏心受压:

Eccentric:

pk=48.24kPa <= fa=90.00kPa 满足! Meet Requirement

pkmax=56.43kPa <= 1.2fa=108.00kPa 满足! Meet Requirement

4.基础冲切承载力验算：

Foundation Bearing Capacity Checking Calculation:

变阶处：Department of variable order

Fl=13.36kN <= 0.7βhpftamh0=392.70kN 满足!Meet requirement

5.基础抗剪承载力验算：

Foundation Shear Strength Checking Calculation

V=34.65kN <= 0.7βhftbh0=392.70kN 满足! Meet requirement

6.抗弯计算结果：

Bending Results

下部受力筋：

layer of Deformed Bar

Mmax = 14.91kN.m

计算面积：565 mm2/m

Area Calculation

实配面积：565 mm2/m

Allocated Area

选筋：D16@150

Select:D16@150 Deformed Bar

1.5 米宽条形基础设计

1.5 meter Width Strip Foundation Design

1．已知条件

Condition

柱底竖向力（每延米）:（296+211+176+157+147+78+56）/36=31.14 kN/m

Column at the end of the vertical force (every extend meter): (296 +211 +176 +157 +147 +78 +56) / 36 = 31.14 kN / m

柱底弯矩（每延米）:（1.8+28.8+26.9+15.8+16.9+14.2+18.2+9.1）/20=3.66 kN.m/m

Column at the end of bending moment (every extend meter): (1.8 +28.8 +26.9 +15.8 +16.9 +14.2 +18.2 +9.1) / 20 = 3.66 kN.m / m

混凝土等级：C30　受力筋级别：HRB335　保护层厚度：40

Concrete grade C30　Deformed Bar: HRB335　Protection layer: 40

2.反力计算：

Reaction Calculation

(1) 荷载标准值时基底全反力 - 用于验算地基承载力

Basic load standard for all force- for checking the bearing capacity of foundation

pk=(Fk+Gk)/A = 60.88 kPa

pKmax = (Fk+Gk)/A + Mk/W = 68.11 kPa

pKmin = (Fk+Gk)/A - Mk/W = 53.65 kPa

(2) 荷载设计值时基底全反力

Basic design Load for all force

p = (F + G)/A = 82.18 kPa

pmax = (F + G)/A + M/W = 91.94 kPa

pmin = (F + G)/A - M/W = 72.42 kPa

(3) 荷载设计值时基底净反力 - 用于验算基础剪切和冲切承载力

Basic design Load at foundation base reaction force- the basis for checking and punching shear capacity

pj = F/A = 20.76 kPa

pmaxj = pmax - G/A = 30.52 kPa

pminj = pmin - G/A = 11.00 kPa

3.地基承载力验算：

Checking Bearing Capacity of Foundation

偏心受压:

Eccentric:

pk=60.88kPa <= fa=90.00kPa 满足! Meet requirement

pkmax=68.11kPa <= 1.2fa=108.00kPa 满足! Meet requirement

4.基础抗剪承载力验算：

Foundation Shear Strength Checking Calculation

V=8.39kN <= 0.7βhftbh0=510.51kN 满足! Meet requirement

5.抗弯计算结果：

Bending Results

下部受力筋：

layer of Deformed Bar

Mmax = 1.11kN.m

计算面积：565 mm2/m

Area Calculation

实配面积：565 mm2/m

Allocated Area

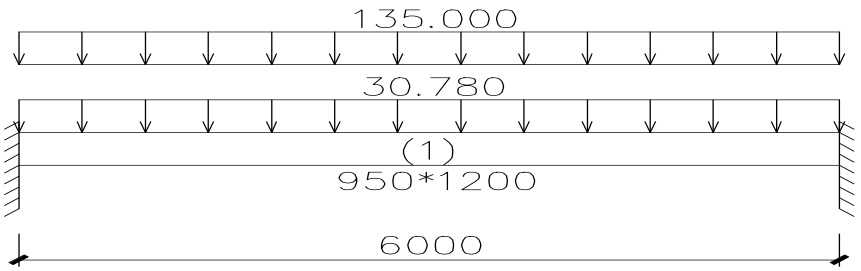
选筋：D14@150

Select: D14@150 Deformed Bar

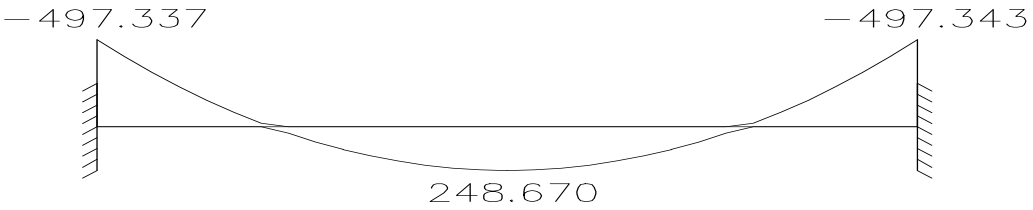
1.5米宽基础基础梁计算书：

1.5 meter width Strip Foundation diagram

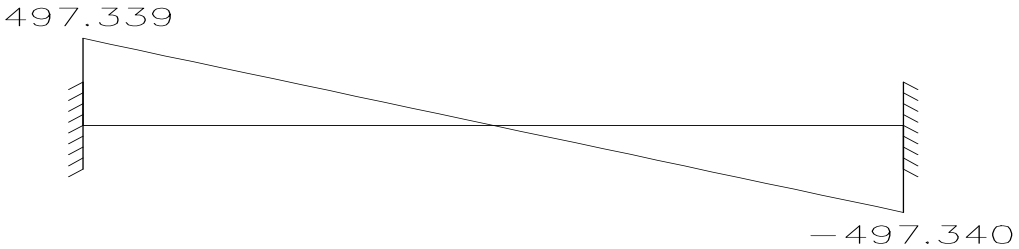
1 计算简图：**Calculation Diagram**



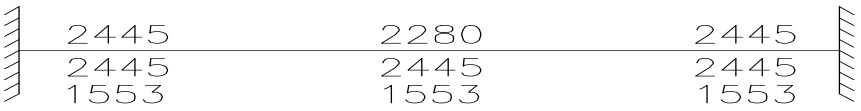
几何尺寸简图(单位: mm)



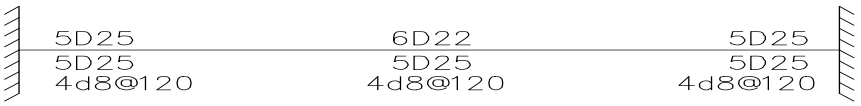
弯矩包络图(调幅后)(单位: kN.m)



剪力包络图(单位: kN)



计算配筋简图



选筋简图

2 计算条件:

Calculation Condition

荷载条件:

Load condition

均布恒载 : 0.00kN/m 活载准永久值系数: 0.50

Uniform Dead Load Coefficiency Permanent Value of Live Load Factor

均布活载 : 0.00kN/m 支座弯矩调幅系数: 100.0%
Uniform Live Load Support bending moment amplitude modulation coefficient
梁容重 : 27.00kN/m^3 计算时考虑梁自重: 考虑
Beam Load Calculate to consider independent beam: Considered
恒载分项系数: 1.00 活载分项系数 : 1.00
Breakdown of dead load factor Live Load Factor
配筋条件:
Rebar
纵筋级别 : HRB335
Level of longitudinal reinforcement
混凝土等级 : C30 箍筋级别 : HPB235
Concrete grade Stirrup Rebar
配筋调整系数: 1.0 上部保护层厚度 : 25mm
Adjustment Reinforced Factor Top Protection Cover
面积归并率 : 30.0% 下部保护层厚度 : 25mm
Area combination rate Bottom Protection Layer
最大裂缝限值: 0.400mm 挠度控制系数C : 200
Maximum Crack Limit Deflection Control Coefficient C
截面配筋方式: 单筋
Reinforcement cross-section: Single Layer

3 计算结果:
Calculation Result

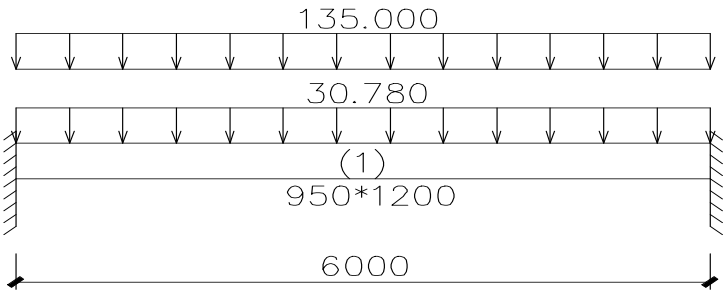
单位说明:
Unit Description
弯 矩:kN.m 剪 力:kN
Moment Shear
纵筋面积:mm^2 箍筋面积:mm^2/m
Area of Longitudinal Reinforcement Area of Stirrups Rebar
裂 缝:mm 挠 度:mm
Cracks Deflection

梁号 1: 跨长 = 6000mm B × H = 950mm × 1200mm
Beam No. Span

	左 Left	中 Middle	右 Right
弯矩(+) : Moment	0.000	248.670	0.000
弯矩(-) : Moment	-497.337	0.000	-497.343
剪 力: Shear	497.339	0.001	-497.340
上部纵筋: The Upper Longitudinal Reinforcement	2445	2280	2445
下部纵筋: The Lower Longitudinal Reinforcement	2445	2445	2445
箍 筋: Stirrups	1553	1553	1553
上纵实配: Vertical Distributer Rebar	5D25(2454)	6D22(2281)	5D25(2454)
下纵实配: Vertical Alocated Rebar	5D25(2454)	5D25(2454)	5D25(2454)
箍筋实配: Stirrups Rebar	4d8@120(1676)	4d8@120(1676)	4d8@120(1676)
腰筋实配: Waist Reinforced Rebar	8D20(2513)	8D20(2513)	8D20(2513)
裂 缝:	0.232	0.052	0.232

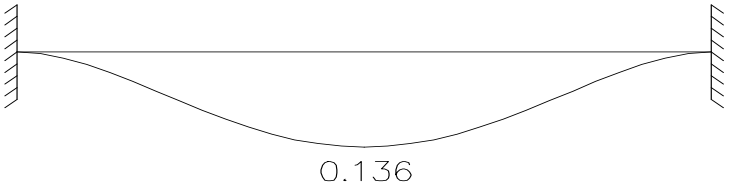
Cracks
挠　　度:　　0.000　　0.697　　0.000
Deflection
最大裂缝:0.232mm<0.400mm
Maximum Cracks
最大挠度:0.697mm<30.000mm(6000/200)
Maximum Deflection
---

4 所有简图:
Schematic

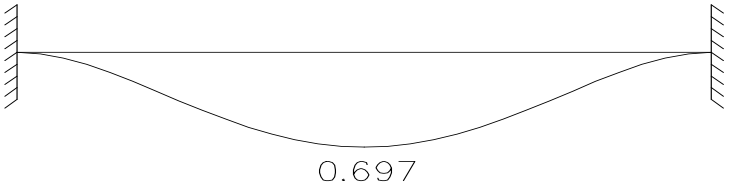


几何尺寸简图(单位:mm)

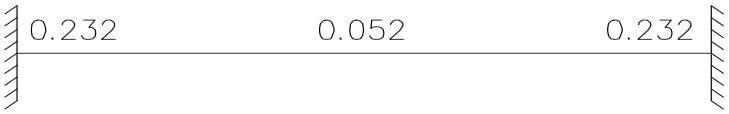
支座反力简图(单位:kN.m(弯矩) kN(剪力))



弹性位移简图(单位:mm)



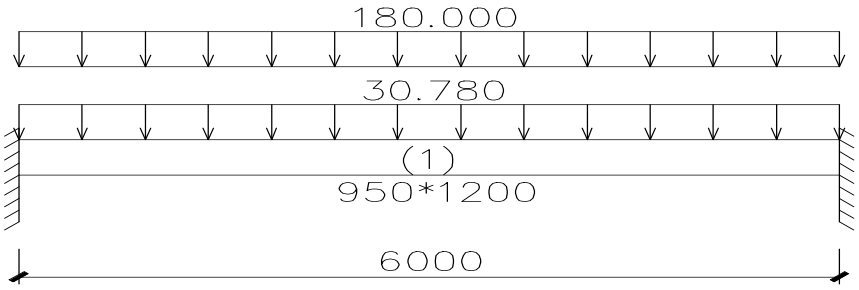
塑性挠度简图(单位:mm)



裂缝简图(单位:mm)

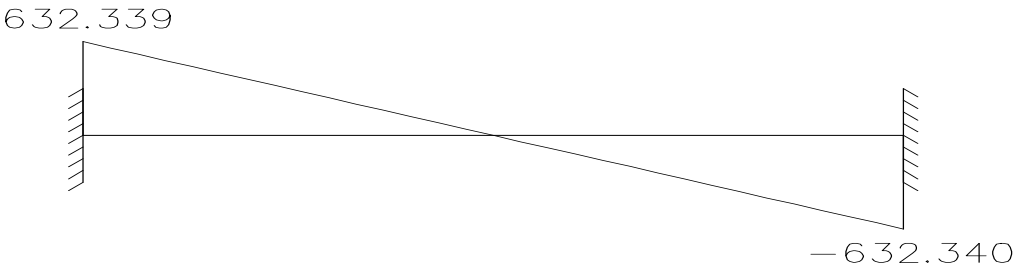
2.0米宽基础基础梁计算书：
2 meter width Strip Foundation diagram

1 计算简图：
Calculation Diagram

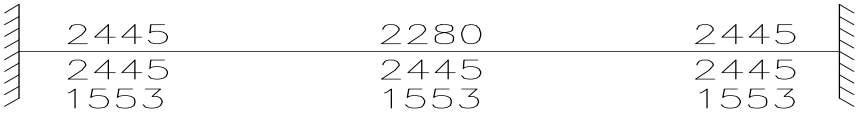


几何尺寸简图(单位:mm)

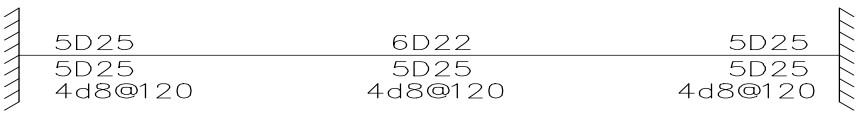
弯矩包络图(调幅后)(单位:kN.m)



剪力包络图(单位:kN)



计算配筋简图



选筋简图

2 计算条件：
Calculation Condition

荷载条件:
Load condition

均布恒载 : 0.00kN/m 活载准永久值系数: 0.50
Uniform Dead Load Coefficiency Permanent Value of Live Load Factor
均布活载 : 0.00kN/m 支座弯矩调幅系数: 100.0%
Uniform Live Load Support bending moment amplitude modulation coefficient
梁容重 : 27.00kN/m^3 计算时考虑梁自重: 考虑
Beam Load Calculate to consider independent beam: Considered
恒载分项系数: 1.00 活载分项系数 : 1.00
Breakdown of dead load factor Live Load Factor

配筋条件:
Rebar

纵筋级别 : HRB335
Level of longitudinal reinforcement
混凝土等级 : C30 箍筋级别 : HPB235
Concrete grade Stirrup Rebar
配筋调整系数: 1.0 上部保护层厚度 : 25mm
Adjustment Reinforced Factor Top Protection Cover
面积归并率 : 30.0% 下部保护层厚度 : 25mm
Area combination rate Bottom Protection Layer
最大裂缝限值: 0.400mm 挠度控制系数C : 200
Maximum Crack Limit Deflection Control Coefficient C
截面配筋方式: 单筋
Reinforcement cross-section: Single Layer

3 计算结果:
Calculation Result

单位说明:
Unit Description

弯 矩:kN.m 剪 力:kN
Moment Shear
纵筋面积:mm^2 箍筋面积:mm^2/m
Area of Longitudinal Reinforcement Area of Stirrups Rebar
裂 缝:mm 挠 度:mm
Cracks Deflection

梁号 1: 跨长 = 6000mm B × H = 950mm × 1200mm
Beam No. Span

	左 Left	中 Middle	右 Right
弯矩(+) : Moment	0.000	316.170	0.000
弯矩(-) : Moment	-632.336	0.000	-632.344
剪 力: Shear	632.339	0.001	-632.340
上部纵筋: The Upper Longitudinal Reinforcement	2445	2280	2445
下部纵筋: The Lower Longitudinal Reinforcement	2445	2445	2445
箍 筋: Stirrups	1553	1553	1553

上纵实配:	5D25(2454)	6D22(2281)	5D25(2454)
Vertical Distributer Rebar			
下纵实配:	5D25(2454)	5D25(2454)	5D25(2454)
Vertical Alocated Rebar			
箍筋实配:	4d8@120(1676)	4d8@120(1676)	4d8@120(1676)
Stirrups Rebar			
腰筋实配:	8D20(2513)	8D20(2513)	8D20(2513)
Waist Reinforced Rebar			
裂　　缝:	0.387	0.066	0.387
Cracks			
挠　　度:	0.000	0.886	0.000
Deflection			

最大裂缝:0.387mm<0.400mm
Maximum Cracks
最大挠度:0.886mm<30.000mm(6000/200)
Maximum Deflection

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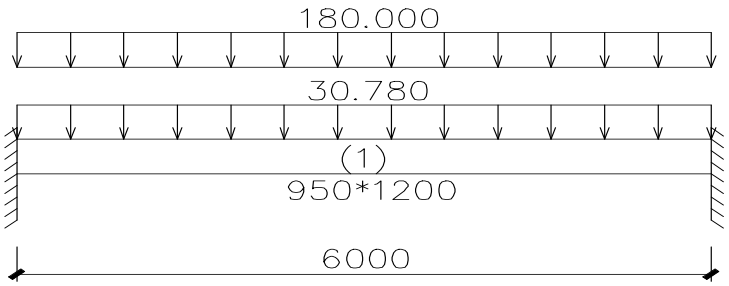
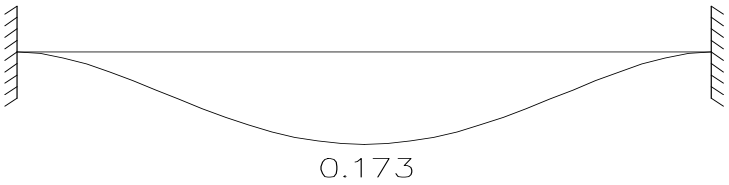
4 所有简图:
Schematic



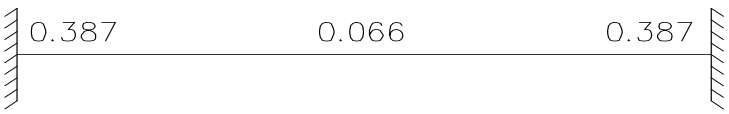
几何尺寸简图(单位: mm)

支座反力简图(单位: kN.m(弯矩) kN(剪力))



弹性位移简图(单位: mm)

塑性挠度简图(单位: mm)



裂缝简图(单位: mm)

舞台独立柱基础设计： DJ-1

The Basic Design of Independent Column: DJ-1

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1 已知条件及计算要求：
Conditions and Calculation Requirements

(1) 已知条件：
Condition
类型：锥形
Type: cone shape
柱数：单柱
Column No：Single Column
阶数：1
Order:1
基础尺寸(单位mm)：
Basic Dimention (mm)
b1=1200, b11=600, a1=1200, a11=600, h1=200, h2=200
dx1=50, dx2=50, dy1=50, dy2=50
柱:方柱, A=400mm, B=400mm
Column:Square Shape Column
设计值：N=43.20kN, Mx=0.00kN.m, Vx=6.75kN, My=0.00kN.m, Vy=6.75kN
Design Value
标准值：Nk=32.00kN, Mxk=0.00kN.m, Vxk=5.00kN, Myk=0.00kN.m, Vyk=5.00kN
Standard Value
混凝土强度等级：C30, f_c=14.30N/mm^2
Concrete Strength Grade
钢筋级别：HRB335, f_y=300N/mm^2
Deformed Bar
基础混凝土保护层厚度：40mm
Foundation Concrete Cover Thickness
基础与覆土的平均容重：20.00kN/m^3
Foundation Average Bulk Density and Soil Load
地基承载力设计值：80kPa
Design value of bearing capacity of foundation
基础埋深：2.50m
Foundation Depth
作用力位置标高：-2.100m
Action Force Position
剪力作用附加弯矩M'=V*h(力臂h=0.400m)：
Shear Force Attachment Bending Moment M' =V*h (Arm of Force h=0.400m):
My'=2.70kN.m
Mx'=-2.70kN.m
Myk'=2.00kN.m
Mxk'=-2.00kN.m

(2) 计算要求：
Calculation Requirement
1. 基础抗弯计算
Foundation Bending Calculation
2. 基础抗剪验算
Foundation Shearing Calculation
3. 基础抗冲切验算
Foundation Anti-Cracking Calculation
4. 地基承载力验算
Foundation Settlement Calculation

---

2 基底反力计算:
Foundation Reaction Force Calculation

(1) 承载力验算时,底板总反力标准值(kPa):[相应于荷载效应标准组合]
Checking settlement capacity, the total floor reaction force standard value (kPa): [load effect corresponding to the standard combination]

pk = (Nk+Gk)/A = 72.22
pkmax = (Nk+Gk)/A + Mkx/Wx + Mky/Wy = 86.11
pkmin = (Nk+Gk)/A - Mkx/Wx - Mky/Wy = 58.33
各角点反力 p1=58.33, p2=72.22, p3=86.11, p4=72.22

(2) 强度计算时,底板净反力设计值(kPa):[相应于荷载效应基本组合]
Strength calculations, the net reaction force at foundation base design value (kPa): [load effect corresponding to the basic portfolio]

p = N/A = 30.00
pmax = N/A + Mx/Wx + My/Wy = 48.75
pmin = N/A - Mx/Wx - My/Wy = 11.25
各角点反力 p1=11.25, p2=30.00, p3=48.75, p4=30.00
Reaction force at each corner

---

3 地基承载力验算:
Foundation Bearing Capacity Calculation

pk=72.22 < fa=80.00kPa, 满足 Meet Requirement
pkmax=86.11 < 1.2*fa=96.00kPa, 满足Meet Requirement

---

4 基础抗剪验算:
Foundation Shearing Calculation

抗剪验算公式 $V<=0.7*\beta_h*ft*Ac$ [GB50010-2002第 item.7.5.3条]
Shear Crack Formula
(剪力V根据最大净反力pmax计算)
(Shear V net reaction force based on the maximum P MAX calculated)
第1阶(kN): V下=23.40, V右=23.40, V上=23.40, V左=23.40
Order No.1
砼抗剪面积(m2): Ac下=0.36, Ac右=0.36, Ac上=0.36, Ac左=0.36
Concrete shear area (m2):
抗剪满足.
Shearing Calculation meet requirement

---

5 基础抗冲切验算:
Foundation Anti-Cracking Calculation

抗冲切验算公式 $F_l<=0.7*\beta_{hp}*ft*Aq$ [GB50007-2002第item.8.2.7条]
Anti-Cracking Formula
(冲切力F_l根据最大净反力pmax计算)
(Cracking force Fl net reaction force based on the maximum P MAX calculated)
第1阶(kN): F_l下=2.53, F_l右=2.53, F_l上=2.53, F_l左=2.53
Order No.1
砼抗冲面积(m^2): Aq下=0.27, Aq右=0.27, Aq上=0.27, Aq左=0.27
Concrete crack area (m2):
抗冲切满足.
Anti-cracking Calculation meet requirement

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6 基础受弯计算:
Foundation Bending Calculation

弯矩计算公式 $M=1/6*l_a^2*(2b+b')*pmax$ [l_a=计算截面处底板悬挑长度]
Bending Formula Canculated the length of cantilevered floor section

配筋计算公式 As=M/(0.9*fy*h_0)
Formula for reinforcement calculation
第1阶(kN.m)： M下=3.64， M右=3.64， M上=3.64， M左=3.64
Order No. 1
计算As(mm^2/m)： As下=32， As右=32， As上=32， As左=32
Calculation
基础板底构造配筋(构造配筋D12@200).
Foundation Base Reinforce rebar (structural reinforce D12@200 rebar)

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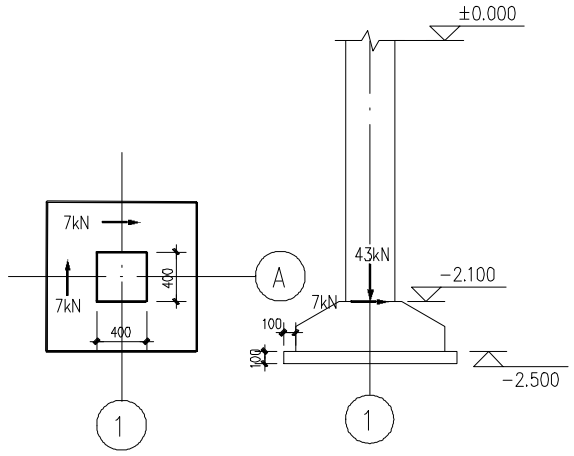
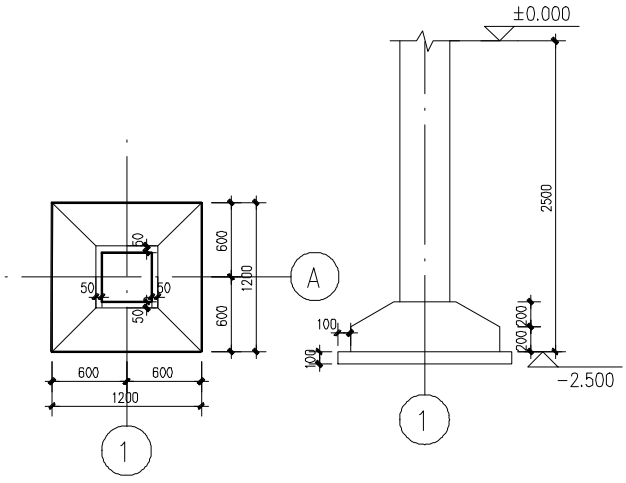
7 底板配筋:

Floor reinforcement

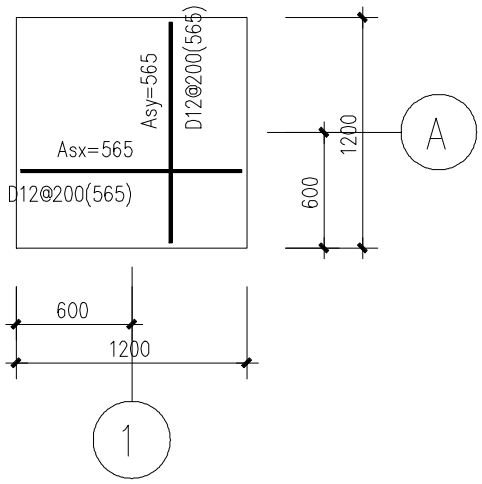
X向实配 D12@200(565mm^2/m) >= As=565mm^2/m
X Dimension reinforce rebar
Y向实配 D12@200(565mm^2/m) >= As=565mm^2/m
Y Dimension reinforce rebar



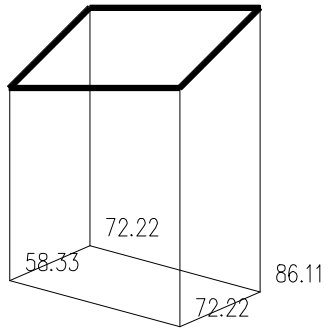
设计荷载简图



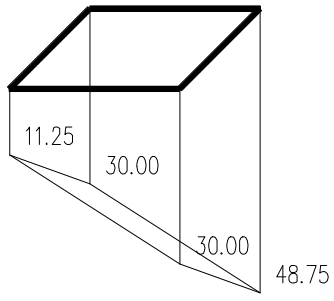
基础尺寸简图



底板配筋简图



总反力标准值(kPa)



净反力设计值(kPa)