桩承台计算\_序号112

# 一、设计资料

1、承台信息

承台底标高：-4.50m

承台上段高：400mm

承台下段高：600mm

承台x方向移心：0mm

承台y方向移心：0mm

2、桩截面信息

桩截面宽：500mm

桩截面高：0mm

单桩承载力：2500.00kN

3、承台混凝土信息

承台混凝土等级：C30

4.桩位坐标:

桩位表

| 桩序号 | 桩X坐标 | 桩Y坐标 |
| --- | --- | --- |
| 1 | -1100 | -1100 |
| 2 | -1100 | 1100 |
| 3 | 0 | -2200 |
| 4 | 0 | 0 |
| 5 | 0 | 2200 |
| 6 | 1100 | -1100 |
| 7 | 1100 | 1100 |

5.柱信息:

柱信息表

| 序号 | 截面宽 | 截面高 | 沿轴偏心 | 偏轴偏心 | 相对转角 |
| --- | --- | --- | --- | --- | --- |
| 柱1 | 700 | 700 | 0 | 1575 | 0 |
| 柱2 | 2 | 300 | -1925 | -0 | 90 |
| 柱3 | 100 | 100 | 0 | -1125 | 0 |
| 外接柱 | 700 | 3851 | 0 | 0 | 0 |

6.设计时执行的规范：

《建筑桩基技术规范》 （JGJ 94－2008） 以下简称 桩基规范

《混凝土结构设计规范》 （GB 50010－2010） 以下简称 混凝土规范

# 二、计算结果

1、桩承载力验算

承台及覆土重:

采用公式：

=±±

= Area×H×γ

= 21.8× 24.0

= 523.9 kN

∑ = 4840000.0 ∑ = 14520000.0

当前荷载组合

| 【4】SATWE标准组合:1.00\*恒+1.00\*风y |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=10645.5kN =-5842.4kN.m =46.9kN.m =31.2kN =156.4kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1100.0 | -1100.0 | 1067.52 | 1142.37 | 满足 |
| 2 | -1100.0 | 1100.0 | 1952.73 | 2027.58 | 满足 |
| 3 | 0.0 | -2200.0 | 635.58 | 710.42 | 满足 |
| 4 | 0.0 | 0.0 | 1520.79 | 1595.64 | 满足 |
| 5 | 0.0 | 2200.0 | 2406.00 | 2480.85 | 满足 |
| 6 | 1100.0 | -1100.0 | 1088.85 | 1163.69 | 满足 |
| 7 | 1100.0 | 1100.0 | 1974.06 | 2048.90 | 满足 |

桩总反力= 11169.5 kN; 桩均反力= 1595.6 kN

当前荷载组合

| 【5】SATWE标准组合:1.00\*恒-1.00\*风y |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=10383.3kN =-1448.9kN.m =48.7kN.m =32.7kN =118.4kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1100.0 | -1100.0 | 1362.49 | 1437.34 | 满足 |
| 2 | -1100.0 | 1100.0 | 1582.03 | 1656.87 | 满足 |
| 3 | 0.0 | -2200.0 | 1263.80 | 1338.64 | 满足 |
| 4 | 0.0 | 0.0 | 1483.33 | 1558.18 | 满足 |
| 5 | 0.0 | 2200.0 | 1702.87 | 1777.72 | 满足 |
| 6 | 1100.0 | -1100.0 | 1384.64 | 1459.49 | 满足 |
| 7 | 1100.0 | 1100.0 | 1604.18 | 1679.02 | 满足 |

桩总反力= 10907.3 kN; 桩均反力= 1558.2 kN

当前荷载组合

| 【18】SATWE标准组合:1.00\*恒+1.00\*活+0.60\*风y |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=13438.3kN =-5909.2kN.m =59.6kN.m =39.7kN =184.8kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1100.0 | -1100.0 | 1458.54 | 1533.38 | 满足 |
| 2 | -1100.0 | 1100.0 | 2353.88 | 2428.72 | 满足 |
| 3 | 0.0 | -2200.0 | 1024.41 | 1099.26 | 满足 |
| 4 | 0.0 | 0.0 | 1919.75 | 1994.60 | 满足 |
| 5 | 0.0 | 2200.0 | 2815.09 | 2889.93 | 满足 |
| 6 | 1100.0 | -1100.0 | 1485.62 | 1560.47 | 满足 |
| 7 | 1100.0 | 1100.0 | 2380.96 | 2455.81 | 满足 |

桩总反力= 13962.2 kN; 桩均反力= 1994.6 kN

当前荷载组合

| 【19】SATWE标准组合:1.00\*恒+1.00\*活-0.60\*风y |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=13280.9kN =-3273.2kN.m =60.7kN.m =40.6kN =161.9kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1100.0 | -1100.0 | 1635.52 | 1710.37 | 满足 |
| 2 | -1100.0 | 1100.0 | 2131.45 | 2206.30 | 满足 |
| 3 | 0.0 | -2200.0 | 1401.34 | 1476.19 | 满足 |
| 4 | 0.0 | 0.0 | 1897.28 | 1972.12 | 满足 |
| 5 | 0.0 | 2200.0 | 2393.21 | 2468.06 | 满足 |
| 6 | 1100.0 | -1100.0 | 1663.10 | 1737.95 | 满足 |
| 7 | 1100.0 | 1100.0 | 2159.03 | 2233.88 | 满足 |

桩总反力= 13804.9 kN; 桩均反力= 1972.1 kN

当前荷载组合

| 【21】SATWE标准组合:1.00\*恒-1.00\*风y+0.70\*活 |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=12375.0kN =-2110.8kN.m =57.3kN.m =38.5kN =143.6kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1100.0 | -1100.0 | 1594.91 | 1669.75 | 满足 |
| 2 | -1100.0 | 1100.0 | 1914.73 | 1989.57 | 满足 |
| 3 | 0.0 | -2200.0 | 1448.03 | 1522.88 | 满足 |
| 4 | 0.0 | 0.0 | 1767.85 | 1842.70 | 满足 |
| 5 | 0.0 | 2200.0 | 2087.67 | 2162.52 | 满足 |
| 6 | 1100.0 | -1100.0 | 1620.97 | 1695.82 | 满足 |
| 7 | 1100.0 | 1100.0 | 1940.79 | 2015.64 | 满足 |

桩总反力= 12898.9 kN; 桩均反力= 1842.7 kN

当前荷载组合

| 【44】SATWE标准组合:1.00\*恒+0.50\*活+0.20\*风y+1.00\*地y |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=12283.2kN =-11231.1kN.m =47.8kN.m =33.3kN =223.3kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1100.0 | -1100.0 | 893.02 | 967.87 | 满足 |
| 2 | -1100.0 | 1100.0 | 2594.71 | 2669.55 | 满足 |
| 3 | 0.0 | -2200.0 | 53.05 | 127.90 | 满足 |
| 4 | 0.0 | 0.0 | 1754.74 | 1829.59 | 满足 |
| 5 | 0.0 | 2200.0 | 3456.43 | 3531.27 | 满足 |
| 6 | 1100.0 | -1100.0 | 914.77 | 989.62 | 满足 |
| 7 | 1100.0 | 1100.0 | 2616.46 | 2691.30 | 满足 |

桩总反力= 12807.1 kN; 桩均反力= 1829.6 kN

当前荷载组合

| 【45】SATWE标准组合:1.00\*恒+0.50\*活-0.20\*风y-1.00\*地y |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=11590.9kN =2994.3kN.m =60.1kN.m =38.8kN =87.5kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1100.0 | -1100.0 | 1869.01 | 1943.86 | 满足 |
| 2 | -1100.0 | 1100.0 | 1415.34 | 1490.18 | 满足 |
| 3 | 0.0 | -2200.0 | 2109.51 | 2184.36 | 满足 |
| 4 | 0.0 | 0.0 | 1655.84 | 1730.68 | 满足 |
| 5 | 0.0 | 2200.0 | 1202.16 | 1277.01 | 满足 |
| 6 | 1100.0 | -1100.0 | 1896.34 | 1971.18 | 满足 |
| 7 | 1100.0 | 1100.0 | 1442.66 | 1517.50 | 满足 |

桩总反力= 12114.8 kN; 桩均反力= 1730.7 kN

2、承台内力配筋计算

当前荷载组合

| 【55】SATWE基本组合:1.35\*恒+0.98\*活 |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=16982.7kN =-5848.3kN.m =76.6kN.m =51.2kN =220.7kN

承台及覆土重:

= 523.9×1.35= 707.3

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) |
| --- | --- | --- | --- | --- |
| 1 | -1100.0 | -1100.0 | 1965.64 | 2066.68 |
| 2 | -1100.0 | 1100.0 | 2851.74 | 2952.78 |
| 3 | 0.0 | -2200.0 | 1540.01 | 1641.05 |
| 4 | 0.0 | 0.0 | 2426.11 | 2527.15 |
| 5 | 0.0 | 2200.0 | 3312.21 | 3413.25 |
| 6 | 1100.0 | -1100.0 | 2000.47 | 2101.51 |
| 7 | 1100.0 | 1100.0 | 2886.57 | 2987.61 |

桩总反力= 17690.0 kN; 桩均反力= 2527.1 kN

b、柱冲切计算：

采用“桩基规范”5.9.7条,公式如下：

≤2[

=, =

截面净高= 950.mm

X正方向:= 500. =0.526

X负方向:= 500. =0.526

Y正方向:= 25. =0.250

Y负方向:= 25. =0.250

= 800. =3950. = 1.16 = 1.87 = 1.43 =0.983

=2[( + ) + ( + )]

=19314.51 kN > =14556.64 × 1.00 kN

c、承台抗剪计算

采用“桩基规范”5.9.9条,公式如下：

V<=

a=

=()

1、左侧抗剪计算

= 950. = 902. =0.526

= [1.75/(+1.0)]

=0.958\*[1.75/(0.526+1.0)]\*5489.\* 950.\*1.4329\*1.e-3

= 8207.3 kN

> = 4817.38 (\* 1.00) kN

2、右侧抗剪计算

= 950. = 500. =0.526

= [1.75/(+1.0)]

=0.958\*[1.75/(0.526+1.0)]\*5489.\* 950.\*1.4329\*1.e-3

= 8207.3 kN

> = 4887.04 (\* 1.00) kN

3、下侧抗剪计算

= 950. = 25. =0.250

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*3089.\* 950.\*1.4329\*1.e-3

= 5640.2 kN

> = 1540.01 (\* 1.00) kN

4、上侧抗剪计算

= 950. = 25. =0.250

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*3089.\* 950.\*1.4329\*1.e-3

= 5640.2 kN

> = 3312.21 (\* 1.00) kN

b、柱冲切计算：

截面净高= 950.mm

X正方向:= 550. =0.579

X负方向:= 550. =0.579

Y正方向:= 75. =0.250

Y负方向:= 74. =0.250

= 700. =3851. = 1.08 = 1.87 = 1.43 =0.983

=2[( + ) + ( + )]

=17912.76 kN > =14556.64 × 1.00 kN

c、承台抗剪计算

1、左侧抗剪计算

= 950. = 903. =0.579

= [1.75/(+1.0)]

=0.958\*[1.75/(0.579+1.0)]\*5489.\* 950.\*1.4329\*1.e-3

= 7933.8 kN

> = 4817.38 (\* 1.00) kN

2、右侧抗剪计算

= 950. = 550. =0.579

= [1.75/(+1.0)]

=0.958\*[1.75/(0.579+1.0)]\*5489.\* 950.\*1.4329\*1.e-3

= 7933.8 kN

> = 4887.04 (\* 1.00) kN

3、下侧抗剪计算

= 950. = 75. =0.250

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*3089.\* 950.\*1.4329\*1.e-3

= 5640.2 kN

> = 1540.01 (\* 1.00) kN

4、上侧抗剪计算

= 950. = 74. =0.250

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*3089.\* 950.\*1.4329\*1.e-3

= 5640.2 kN

> = 3312.21 (\* 1.00) kN

承台阶梯高度：

1阶高： 600mm

2阶高： 400mm

3、承台板抗弯计算

X方向配筋计算：

= 3613.04\*1.00= 3613.04 X = -350. H = 950.

= /(0.9\*\*)/YS = 3613.04/(0.9\* 950.0\*360.0)/5.9= 1989.5 /m

= 3665.28\*1.00= 3665.28 X = 350. H = 950.

= /(0.9\*\*)/YS = 3665.28/(0.9\* 950.0\*360.0)/5.9= 2018.3 /m

= 3665.28\*1.00= 3665.28 X = 350. H = 950.

= /(0.9\*\*)/YS = 3665.28/(0.9\* 950.0\*360.0)/5.9= 2018.3 /m

Y方向配筋计算：

= 423.50\*1.00= 423.50 Y =-1925. H = 950.

= /(0.9\*\*)/XS = 423.50/(0.9\* 950.0\*360.0)/3.7= 371.9 /m

= 907.55\*1.00= 907.55 Y = 1926. H = 950.

= /(0.9\*\*)/XS = 907.55/(0.9\* 950.0\*360.0)/3.7= 796.9 /m

= 910.86\*1.00= 910.86 Y = 1925. H = 950.

= /(0.9\*\*)/XS = 910.86/(0.9\* 950.0\*360.0)/3.7= 799.8 /m

计算的钢筋面积：

= 2018./m = 800./m

当前荷载组合

| 【72】SATWE基本组合:1.20\*恒+1.40\*活+0.84\*风y |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=16710.7kN =-7543.8kN.m =73.9kN.m =49.3kN =231.2kN

承台及覆土重:

= 523.9×1.20= 628.7

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) |
| --- | --- | --- | --- | --- |
| 1 | -1100.0 | -1100.0 | 1798.95 | 1888.77 |
| 2 | -1100.0 | 1100.0 | 2941.95 | 3031.77 |
| 3 | 0.0 | -2200.0 | 1244.24 | 1334.05 |
| 4 | 0.0 | 0.0 | 2387.24 | 2477.05 |
| 5 | 0.0 | 2200.0 | 3530.24 | 3620.05 |
| 6 | 1100.0 | -1100.0 | 1832.53 | 1922.34 |
| 7 | 1100.0 | 1100.0 | 2975.52 | 3065.34 |

桩总反力= 17339.4 kN; 桩均反力= 2477.1 kN

台阶1 H = 600.00 mm

a、角桩冲切计算：

采用“桩基规范”5.9.8条,公式如下：

≤[

=, =

角桩No.=1

= 500. =0.53 = 950.

= 950. =1.00 = 2050.

= 550. =0.7710 = 0.467 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 3003.04 kN > = 1798.95(×1.00) kN

角桩No.=2

= 950. =1.00 = 2050.

= 25. =0.25 = 950.

= 550. =0.4667 = 1.244 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 4241.26 kN > = 1244.24(×1.00) kN

角桩No.=3

= 950. =1.00 = 2050.

= 25. =0.25 = 950.

= 550. =0.4667 = 1.244 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 4241.26 kN > = 3530.24(×1.00) kN

角桩No.=4

= 500. =0.53 = 950.

= 950. =1.00 = 2050.

= 550. =0.7710 = 0.467 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 3003.04 kN > = 2941.95(×1.00) kN

台阶2 H = 1000.00 mm

3、承台板抗弯计算

X方向配筋计算：

= 3555.68\*1.00= 3555.68 X = -350. H = 950.

= /(0.9\*\*)/YS = 3555.68/(0.9\* 950.0\*360.0)/5.9= 1958.0 /m

= 3606.04\*1.00= 3606.04 X = 350. H = 950.

= /(0.9\*\*)/YS = 3606.04/(0.9\* 950.0\*360.0)/5.9= 1985.7 /m

= 3606.04\*1.00= 3606.04 X = 350. H = 950.

= /(0.9\*\*)/YS = 3606.04/(0.9\* 950.0\*360.0)/5.9= 1985.7 /m

Y方向配筋计算：

= 342.17\*1.00= 342.17 Y =-1925. H = 950.

= /(0.9\*\*)/XS = 342.17/(0.9\* 950.0\*360.0)/3.7= 300.4 /m

= 967.28\*1.00= 967.28 Y = 1926. H = 950.

= /(0.9\*\*)/XS = 967.28/(0.9\* 950.0\*360.0)/3.7= 849.3 /m

= 970.82\*1.00= 970.82 Y = 1925. H = 950.

= /(0.9\*\*)/XS = 970.82/(0.9\* 950.0\*360.0)/3.7= 852.4 /m

计算的钢筋面积：

= 1986./m = 852./m

当前荷载组合

| 【73】SATWE基本组合:1.20\*恒+1.40\*活-0.84\*风y |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=16490.4kN =-3853.3kN.m =75.4kN.m =50.5kN =199.2kN

承台及覆土重:

= 523.9×1.20= 628.7

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) |
| --- | --- | --- | --- | --- |
| 1 | -1100.0 | -1100.0 | 2046.73 | 2136.54 |
| 2 | -1100.0 | 1100.0 | 2630.56 | 2720.37 |
| 3 | 0.0 | -2200.0 | 1771.94 | 1861.76 |
| 4 | 0.0 | 0.0 | 2355.78 | 2445.59 |
| 5 | 0.0 | 2200.0 | 2939.61 | 3029.42 |
| 6 | 1100.0 | -1100.0 | 2080.99 | 2170.81 |
| 7 | 1100.0 | 1100.0 | 2664.82 | 2754.64 |

桩总反力= 17119.1 kN; 桩均反力= 2445.6 kN

台阶1 H = 600.00 mm

a、角桩冲切计算：

采用“桩基规范”5.9.8条,公式如下：

≤[

=, =

角桩No.=1

= 500. =0.53 = 950.

= 950. =1.00 = 2050.

= 550. =0.7710 = 0.467 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 3003.04 kN > = 2046.73(×1.00) kN

角桩No.=2

= 950. =1.00 = 2050.

= 25. =0.25 = 950.

= 550. =0.4667 = 1.244 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 4241.26 kN > = 1771.94(×1.00) kN

角桩No.=3

= 950. =1.00 = 2050.

= 25. =0.25 = 950.

= 550. =0.4667 = 1.244 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 4241.26 kN > = 2939.61(×1.00) kN

角桩No.=4

= 500. =0.53 = 950.

= 950. =1.00 = 2050.

= 550. =0.7710 = 0.467 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 3003.04 kN > = 2630.56(×1.00) kN

台阶2 H = 1000.00 mm

当前荷载组合

| 【98】SATWE基本组合:1.20\*恒+0.60\*活+0.20\*风y+1.30\*地y |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=14766.6kN =-14056.8kN.m =56.9kN.m =39.7kN =273.6kN

承台及覆土重:

= 523.9×1.20= 628.7

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) |
| --- | --- | --- | --- | --- |
| 1 | -1100.0 | -1100.0 | 1031.68 | 1121.49 |
| 2 | -1100.0 | 1100.0 | 3161.50 | 3251.31 |
| 3 | 0.0 | -2200.0 | -20.31 | 69.50 |
| 4 | 0.0 | 0.0 | 2109.51 | 2199.32 |
| 5 | 0.0 | 2200.0 | 4239.33 | 4329.15 |
| 6 | 1100.0 | -1100.0 | 1057.52 | 1147.34 |
| 7 | 1100.0 | 1100.0 | 3187.34 | 3277.16 |

桩总反力= 15395.3 kN; 桩均反力= 2199.3 kN

台阶1 H = 600.00 mm

a、角桩冲切计算：

采用“桩基规范”5.9.8条,公式如下：

≤[

=, =

角桩No.=1

= 500. =0.53 = 950.

= 950. =1.00 = 2050.

= 550. =0.7710 = 0.467 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 3003.04 kN > = 1031.68(×0.85) kN

角桩No.=2

= 950. =1.00 = 2050.

= 25. =0.25 = 950.

= 550. =0.4667 = 1.244 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 4241.26 kN > = -20.31(×0.85) kN

角桩No.=3

= 950. =1.00 = 2050.

= 25. =0.25 = 950.

= 550. =0.4667 = 1.244 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 4241.26 kN > = 4239.33(×0.85) kN

角桩No.=4

= 500. =0.53 = 950.

= 950. =1.00 = 2050.

= 550. =0.7710 = 0.467 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 3003.04 kN > = 3161.50(×0.85) kN

c、承台抗剪计算

采用“桩基规范”5.9.9条,公式如下：

V<=

a=

=()

1、左侧抗剪计算

= 950. = 902. =0.526

= [1.75/(+1.0)]

=0.958\*[1.75/(0.526+1.0)]\*5489.\* 950.\*1.4329\*1.e-3

= 8207.3 kN

> = 4193.17 (\* 0.85) kN

2、右侧抗剪计算

= 950. = 500. =0.526

= [1.75/(+1.0)]

=0.958\*[1.75/(0.526+1.0)]\*5489.\* 950.\*1.4329\*1.e-3

= 8207.3 kN

> = 4244.86 (\* 0.85) kN

3、下侧抗剪计算

= 950. = 25. =0.250

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*3089.\* 950.\*1.4329\*1.e-3

= 5640.2 kN

> = -20.31 (\* 0.85) kN

4、上侧抗剪计算

= 950. = 25. =0.250

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*3089.\* 950.\*1.4329\*1.e-3

= 5640.2 kN

> = 4239.33 (\* 0.85) kN

台阶2 H = 1000.00 mm

c、承台抗剪计算

1、左侧抗剪计算

= 950. = 903. =0.579

= [1.75/(+1.0)]

=0.958\*[1.75/(0.579+1.0)]\*5489.\* 950.\*1.4329\*1.e-3

= 7933.8 kN

> = 4193.17 (\* 0.85) kN

2、右侧抗剪计算

= 950. = 550. =0.579

= [1.75/(+1.0)]

=0.958\*[1.75/(0.579+1.0)]\*5489.\* 950.\*1.4329\*1.e-3

= 7933.8 kN

> = 4244.86 (\* 0.85) kN

3、下侧抗剪计算

= 950. = 75. =0.250

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*3089.\* 950.\*1.4329\*1.e-3

= 5640.2 kN

> = -20.31 (\* 0.85) kN

4、上侧抗剪计算

= 950. = 74. =0.250

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*3089.\* 950.\*1.4329\*1.e-3

= 5640.2 kN

> = 4239.33 (\* 0.85) kN

承台阶梯高度：

1阶高： 600mm

2阶高： 400mm

当前荷载组合

| 【99】SATWE基本组合:1.20\*恒+0.60\*活-0.20\*风y-1.30\*地y |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=13882.3kN =4172.6kN.m =72.7kN.m =46.8kN =99.3kN

承台及覆土重:

= 523.9×1.20= 628.7

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) |
| --- | --- | --- | --- | --- |
| 1 | -1100.0 | -1100.0 | 2282.77 | 2372.58 |
| 2 | -1100.0 | 1100.0 | 1650.56 | 1740.37 |
| 3 | 0.0 | -2200.0 | 2615.39 | 2705.21 |
| 4 | 0.0 | 0.0 | 1983.18 | 2073.00 |
| 5 | 0.0 | 2200.0 | 1350.97 | 1440.79 |
| 6 | 1100.0 | -1100.0 | 2315.81 | 2405.62 |
| 7 | 1100.0 | 1100.0 | 1683.60 | 1773.41 |

桩总反力= 14511.0 kN; 桩均反力= 2073.0 kN

台阶1 H = 600.00 mm

a、角桩冲切计算：

采用“桩基规范”5.9.8条,公式如下：

≤[

=, =

角桩No.=1

= 500. =0.53 = 950.

= 950. =1.00 = 2050.

= 550. =0.7710 = 0.467 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 3003.04 kN > = 2282.77(×0.85) kN

角桩No.=2

= 950. =1.00 = 2050.

= 25. =0.25 = 950.

= 550. =0.4667 = 1.244 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 4241.26 kN > = 2615.39(×0.85) kN

角桩No.=3

= 950. =1.00 = 2050.

= 25. =0.25 = 950.

= 550. =0.4667 = 1.244 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 4241.26 kN > = 1350.97(×0.85) kN

角桩No.=4

= 500. =0.53 = 950.

= 950. =1.00 = 2050.

= 550. =0.7710 = 0.467 =1.00 = 1.433

=[( +/2)+ (+/2)]

= 3003.04 kN > = 1650.56(×0.85) kN

台阶2 H = 1000.00 mm

# 三、结果汇总

标准组合下桩反力:

最大最小桩反力及对应的标准组合

| 桩号 | 最大反力（非震）(Load) | 最小反力（非震）(Load) | 最大反力（震）(Load) | 最小反力（震）(Load) |
| --- | --- | --- | --- | --- |
| 1 | 1710.37 (19) | 1142.37 (4) | 1943.86 (45) | 967.87 (44) |
| 2 | 2428.72 (18) | 1656.87 (5) | 2669.55 (44) | 1490.18 (45) |
| 3 | 1522.88 (21) | 710.42 (4) | 2184.36 (45) | 127.90 (44) |
| 4 | 1994.60 (18) | 1558.18 (5) | 1829.59 (44) | 1730.68 (45) |
| 5 | 2889.93 (18) | 1777.72 (5) | 3531.27 (44) | 1277.01 (45) |
| 6 | 1737.95 (19) | 1163.69 (4) | 1971.18 (45) | 989.62 (44) |
| 7 | 2455.81 (18) | 1679.02 (5) | 2691.30 (44) | 1517.50 (45) |

桩平均反力最大值1994.60 (非震)(Load 18)

桩平均反力最小值1558.18 (非震)(Load 5)

桩平均反力最大值1829.59 (震)(Load 44)

桩平均反力最小值1730.68 (震)(Load 45)

基本组合下承台冲切、剪切、配筋计算:

角桩冲切计算：

桩 1: 抗力3003.04 kN 冲切力2046.73 kN ：550 mm (Load:73)

桩 2: 抗力4241.26 kN 冲切力2223.08 kN ：550 mm (Load:99)

桩 3: 抗力4241.26 kN 冲切力3603.43 kN ：550 mm (Load:98)

桩 4: 抗力3003.04 kN 冲切力2941.95 kN ：550 mm (Load:72)

柱冲切计算：

抗力17912.76 kN 冲切力14556.64 kN ：950 mm Load：55

抗剪计算：

1左边： 抗力7933.77kN 剪力4817.38kN ：950mm (Load:55)

2右边： 抗力7933.77kN 剪力4887.04kN ：950mm (Load:55)

3上边： 抗力5640.15kN 剪力-17.26kN ：950mm (Load:98)

4下边： 抗力5640.15kN 剪力3603.43kN ：950mm (Load:98)

承台高度：

一阶高600 二阶高400

底板配筋计算：

X方向：弯矩3665.28 kN.m 计算钢筋面积2018 /m Load： 55

Y方向：弯矩970.82 kN.m 计算钢筋面积852 /m Load： 72

根据最小配筋率计算承台最小配筋：

= 1401. /m

= 1265. /m

原钢筋x方向配筋量不满足

原钢筋y方向配筋量不满足

计算的配筋方案为：

Agx: HRB400 18@100

Agy: HRB400 12@130