桩承台计算\_序号113

# 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 |
| 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

| 【3】SATWE标准组合:1.00\*恒-1.00\*风x |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=10112.0kN =-3473.6kN.m =-60.6kN.m =-31.6kN =128.8kN

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 | 1195.20 | 1270.05 | 满足 |
| 2 | -1100.0 | 1100.0 | 1721.51 | 1796.35 | 满足 |
| 3 | 0.0 | -2200.0 | 918.27 | 993.11 | 满足 |
| 4 | 0.0 | 0.0 | 1444.57 | 1519.42 | 满足 |
| 5 | 0.0 | 2200.0 | 1970.88 | 2045.72 | 满足 |
| 6 | 1100.0 | -1100.0 | 1167.64 | 1242.49 | 满足 |
| 7 | 1100.0 | 1100.0 | 1693.95 | 1768.79 | 满足 |

桩总反力= 10635.9 kN; 桩均反力= 1519.4 kN

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=10647.6kN =-5829.6kN.m =-36.6kN.m =-24.2kN =153.5kN

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 | 1087.77 | 1162.61 | 满足 |
| 2 | -1100.0 | 1100.0 | 1971.04 | 2045.89 | 满足 |
| 3 | 0.0 | -2200.0 | 637.80 | 712.65 | 满足 |
| 4 | 0.0 | 0.0 | 1521.08 | 1595.93 | 满足 |
| 5 | 0.0 | 2200.0 | 2404.36 | 2479.21 | 满足 |
| 6 | 1100.0 | -1100.0 | 1071.12 | 1145.97 | 满足 |
| 7 | 1100.0 | 1100.0 | 1954.40 | 2029.25 | 满足 |

桩总反力= 11171.5 kN; 桩均反力= 1595.9 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=10315.9kN =-1422.6kN.m =-39.0kN.m =-25.6kN =114.6kN

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 | 1374.78 | 1449.63 | 满足 |
| 2 | -1100.0 | 1100.0 | 1590.32 | 1665.17 | 满足 |
| 3 | 0.0 | -2200.0 | 1258.16 | 1333.01 | 满足 |
| 4 | 0.0 | 0.0 | 1473.70 | 1548.55 | 满足 |
| 5 | 0.0 | 2200.0 | 1689.24 | 1764.09 | 满足 |
| 6 | 1100.0 | -1100.0 | 1357.08 | 1431.92 | 满足 |
| 7 | 1100.0 | 1100.0 | 1572.62 | 1647.46 | 满足 |

桩总反力= 10839.8 kN; 桩均反力= 1548.5 kN

当前荷载组合

| 【14】SATWE标准组合:1.00\*恒+1.00\*活+0.60\*风x |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=13458.6kN =-4628.7kN.m =-36.1kN.m =-28.8kN =171.3kN

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 | 1580.20 | 1655.05 | 满足 |
| 2 | -1100.0 | 1100.0 | 2281.52 | 2356.36 | 满足 |
| 3 | 0.0 | -2200.0 | 1221.35 | 1296.19 | 满足 |
| 4 | 0.0 | 0.0 | 1922.66 | 1997.50 | 满足 |
| 5 | 0.0 | 2200.0 | 2623.97 | 2698.81 | 满足 |
| 6 | 1100.0 | -1100.0 | 1563.80 | 1638.64 | 满足 |
| 7 | 1100.0 | 1100.0 | 2265.11 | 2339.96 | 满足 |

桩总反力= 13982.5 kN; 桩均反力= 1997.5 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=13336.3kN =-5859.3kN.m =-49.1kN.m =-32.4kN =179.9kN

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 | 1472.45 | 1547.30 | 满足 |
| 2 | -1100.0 | 1100.0 | 2360.23 | 2435.07 | 满足 |
| 3 | 0.0 | -2200.0 | 1017.41 | 1092.26 | 满足 |
| 4 | 0.0 | 0.0 | 1905.18 | 1980.03 | 满足 |
| 5 | 0.0 | 2200.0 | 2792.95 | 2867.80 | 满足 |
| 6 | 1100.0 | -1100.0 | 1450.14 | 1524.98 | 满足 |
| 7 | 1100.0 | 1100.0 | 2337.91 | 2412.75 | 满足 |

桩总反力= 13860.2 kN; 桩均反力= 1980.0 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=13137.3kN =-3215.0kN.m =-50.5kN.m =-33.2kN =156.5kN

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 | 1644.67 | 1719.51 | 满足 |
| 2 | -1100.0 | 1100.0 | 2131.79 | 2206.64 | 满足 |
| 3 | 0.0 | -2200.0 | 1389.62 | 1464.47 | 满足 |
| 4 | 0.0 | 0.0 | 1876.75 | 1951.60 | 满足 |
| 5 | 0.0 | 2200.0 | 2363.88 | 2438.73 | 满足 |
| 6 | 1100.0 | -1100.0 | 1621.71 | 1696.56 | 满足 |
| 7 | 1100.0 | 1100.0 | 2108.84 | 2183.68 | 满足 |

桩总反力= 13661.2 kN; 桩均反力= 1951.6 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=12244.4kN =-2060.3kN.m =-47.4kN.m =-31.1kN =138.5kN

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 | 1603.88 | 1678.73 | 满足 |
| 2 | -1100.0 | 1100.0 | 1916.05 | 1990.90 | 满足 |
| 3 | 0.0 | -2200.0 | 1437.04 | 1511.88 | 满足 |
| 4 | 0.0 | 0.0 | 1749.20 | 1824.05 | 满足 |
| 5 | 0.0 | 2200.0 | 2061.37 | 2136.22 | 满足 |
| 6 | 1100.0 | -1100.0 | 1582.35 | 1657.20 | 满足 |
| 7 | 1100.0 | 1100.0 | 1894.52 | 1969.37 | 满足 |

桩总反力= 12768.3 kN; 桩均反力= 1824.0 kN

当前荷载组合

| 【42】SATWE标准组合:1.00\*恒+0.50\*活+0.20\*风x+1.00\*地x |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=13220.4kN =-4357.7kN.m =67.9kN.m =2.1kN =170.5kN

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 | 1543.08 | 1617.92 | 满足 |
| 2 | -1100.0 | 1100.0 | 2203.33 | 2278.17 | 满足 |
| 3 | 0.0 | -2200.0 | 1228.38 | 1303.23 | 满足 |
| 4 | 0.0 | 0.0 | 1888.63 | 1963.48 | 满足 |
| 5 | 0.0 | 2200.0 | 2548.88 | 2623.73 | 满足 |
| 6 | 1100.0 | -1100.0 | 1573.93 | 1648.78 | 满足 |
| 7 | 1100.0 | 1100.0 | 2234.18 | 2309.03 | 满足 |

桩总反力= 13744.3 kN; 桩均反力= 1963.5 kN

当前荷载组合

| 【43】SATWE标准组合:1.00\*恒+0.50\*活-0.20\*风x-1.00\*地x |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=10498.1kN =-3805.6kN.m =-155.5kN.m =-59.8kN =131.8kN

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 | 1246.76 | 1321.60 | 满足 |
| 2 | -1100.0 | 1100.0 | 1823.37 | 1898.21 | 满足 |
| 3 | 0.0 | -2200.0 | 923.12 | 997.97 | 满足 |
| 4 | 0.0 | 0.0 | 1499.73 | 1574.57 | 满足 |
| 5 | 0.0 | 2200.0 | 2076.34 | 2151.18 | 满足 |
| 6 | 1100.0 | -1100.0 | 1176.09 | 1250.94 | 满足 |
| 7 | 1100.0 | 1100.0 | 1752.70 | 1827.54 | 满足 |

桩总反力= 11022.0 kN; 桩均反力= 1574.6 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=12185.9kN =-11136.7kN.m =-37.5kN.m =-26.4kN =217.9kN

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 | 905.67 | 980.51 | 满足 |
| 2 | -1100.0 | 1100.0 | 2593.05 | 2667.90 | 满足 |
| 3 | 0.0 | -2200.0 | 53.46 | 128.31 | 满足 |
| 4 | 0.0 | 0.0 | 1740.85 | 1815.69 | 满足 |
| 5 | 0.0 | 2200.0 | 3428.23 | 3503.08 | 满足 |
| 6 | 1100.0 | -1100.0 | 888.64 | 963.49 | 满足 |
| 7 | 1100.0 | 1100.0 | 2576.02 | 2650.87 | 满足 |

桩总反力= 12709.8 kN; 桩均反力= 1815.7 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=11532.6kN =2973.5kN.m =-50.1kN.m =-31.3kN =84.4kN

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 | 1884.17 | 1959.01 | 满足 |
| 2 | -1100.0 | 1100.0 | 1433.64 | 1508.49 | 满足 |
| 3 | 0.0 | -2200.0 | 2098.04 | 2172.88 | 满足 |
| 4 | 0.0 | 0.0 | 1647.51 | 1722.36 | 满足 |
| 5 | 0.0 | 2200.0 | 1196.99 | 1271.83 | 满足 |
| 6 | 1100.0 | -1100.0 | 1861.38 | 1936.23 | 满足 |
| 7 | 1100.0 | 1100.0 | 1410.86 | 1485.70 | 满足 |

桩总反力= 12056.5 kN; 桩均反力= 1722.4 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=16850.3kN =-5788.1kN.m =-62.8kN.m =-41.4kN =214.4kN

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 | 1982.96 | 2084.00 |
| 2 | -1100.0 | 1100.0 | 2859.94 | 2960.98 |
| 3 | 0.0 | -2200.0 | 1530.20 | 1631.24 |
| 4 | 0.0 | 0.0 | 2407.18 | 2508.22 |
| 5 | 0.0 | 2200.0 | 3284.16 | 3385.21 |
| 6 | 1100.0 | -1100.0 | 1954.42 | 2055.46 |
| 7 | 1100.0 | 1100.0 | 2831.40 | 2932.45 |

桩总反力= 17557.6 kN; 桩均反力= 2508.2 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 > =14443.09 × 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

> = 4842.90 (\* 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

> = 4785.83 (\* 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

> = 1530.20 (\* 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

> = 3284.16 (\* 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 > =14443.09 × 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

> = 4842.90 (\* 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

> = 4785.83 (\* 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

> = 1530.20 (\* 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

> = 3284.16 (\* 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：

= 3632.18\*1.00= 3632.18 X = -350. H = 950.

= /(0.9\*\*)/YS = 3632.18/(0.9\* 950.0\*360.0)/5.9= 2000.1 /m

= 3589.37\*1.00= 3589.37 X = 350. H = 950.

= /(0.9\*\*)/YS = 3589.37/(0.9\* 950.0\*360.0)/5.9= 1976.5 /m

= 3632.18\*1.00= 3632.18 X = -350. H = 950.

= /(0.9\*\*)/YS = 3632.18/(0.9\* 950.0\*360.0)/5.9= 2000.1 /m

Y方向配筋计算：

= 420.81\*1.00= 420.81 Y =-1925. H = 950.

= /(0.9\*\*)/XS = 420.81/(0.9\* 950.0\*360.0)/3.7= 369.5 /m

= 899.86\*1.00= 899.86 Y = 1926. H = 950.

= /(0.9\*\*)/XS = 899.86/(0.9\* 950.0\*360.0)/3.7= 790.1 /m

= 903.15\*1.00= 903.15 Y = 1925. H = 950.

= /(0.9\*\*)/XS = 903.15/(0.9\* 950.0\*360.0)/3.7= 793.0 /m

计算的钢筋面积：

= 2000./m = 793./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=16574.4kN =-7477.8kN.m =-61.2kN.m =-40.4kN =225.0kN

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 | 1815.18 | 1905.00 |
| 2 | -1100.0 | 1100.0 | 2948.18 | 3037.99 |
| 3 | 0.0 | -2200.0 | 1234.78 | 1324.59 |
| 4 | 0.0 | 0.0 | 2367.77 | 2457.59 |
| 5 | 0.0 | 2200.0 | 3500.77 | 3590.59 |
| 6 | 1100.0 | -1100.0 | 1787.37 | 1877.19 |
| 7 | 1100.0 | 1100.0 | 2920.37 | 3010.18 |

桩总反力= 17203.1 kN; 桩均反力= 2457.6 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 > = 1815.18(×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 > = 1234.78(×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 > = 3500.77(×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 > = 2948.18(×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：

= 3572.52\*1.00= 3572.52 X = -350. H = 950.

= /(0.9\*\*)/YS = 3572.52/(0.9\* 950.0\*360.0)/5.9= 1967.2 /m

= 3530.80\*1.00= 3530.80 X = 350. H = 950.

= /(0.9\*\*)/YS = 3530.80/(0.9\* 950.0\*360.0)/5.9= 1944.3 /m

= 3572.52\*1.00= 3572.52 X = -350. H = 950.

= /(0.9\*\*)/YS = 3572.52/(0.9\* 950.0\*360.0)/5.9= 1967.2 /m

Y方向配筋计算：

= 339.56\*1.00= 339.56 Y =-1925. H = 950.

= /(0.9\*\*)/XS = 339.56/(0.9\* 950.0\*360.0)/3.7= 298.2 /m

= 959.21\*1.00= 959.21 Y = 1926. H = 950.

= /(0.9\*\*)/XS = 959.21/(0.9\* 950.0\*360.0)/3.7= 842.3 /m

= 962.71\*1.00= 962.71 Y = 1925. H = 950.

= /(0.9\*\*)/XS = 962.71/(0.9\* 950.0\*360.0)/3.7= 845.3 /m

计算的钢筋面积：

= 1967./m = 845./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=16295.8kN =-3775.8kN.m =-63.1kN.m =-41.5kN =192.3kN

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 | 2056.28 | 2146.09 |
| 2 | -1100.0 | 1100.0 | 2628.37 | 2718.19 |
| 3 | 0.0 | -2200.0 | 1755.88 | 1845.69 |
| 4 | 0.0 | 0.0 | 2327.97 | 2417.79 |
| 5 | 0.0 | 2200.0 | 2900.07 | 2989.89 |
| 6 | 1100.0 | -1100.0 | 2027.57 | 2117.39 |
| 7 | 1100.0 | 1100.0 | 2599.67 | 2689.49 |

桩总反力= 16924.5 kN; 桩均反力= 2417.8 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 > = 2056.28(×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 > = 1755.88(×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 > = 2900.07(×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 > = 2628.37(×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=14645.8kN =-13937.4kN.m =-44.4kN.m =-31.5kN =266.9kN

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 | 1046.49 | 1136.30 |
| 2 | -1100.0 | 1100.0 | 3158.21 | 3248.03 |
| 3 | 0.0 | -2200.0 | -19.46 | 70.35 |
| 4 | 0.0 | 0.0 | 2092.26 | 2182.08 |
| 5 | 0.0 | 2200.0 | 4203.99 | 4293.80 |
| 6 | 1100.0 | -1100.0 | 1026.31 | 1116.12 |
| 7 | 1100.0 | 1100.0 | 3138.03 | 3227.85 |

桩总反力= 15274.5 kN; 桩均反力= 2182.1 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 > = 1046.49(×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 > = -19.46(×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 > = 4203.99(×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 > = 3158.21(×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

> = 4204.70 (\* 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

> = 4164.34 (\* 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

> = -19.46 (\* 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

> = 4203.99 (\* 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

> = 4204.70 (\* 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

> = 4164.34 (\* 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

> = -19.46 (\* 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

> = 4203.99 (\* 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=13816.4kN =4141.5kN.m =-60.7kN.m =-37.7kN =95.7kN

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 | 2301.31 | 2391.13 |
| 2 | -1100.0 | 1100.0 | 1673.82 | 1763.63 |
| 3 | 0.0 | -2200.0 | 2601.26 | 2691.08 |
| 4 | 0.0 | 0.0 | 1973.77 | 2063.58 |
| 5 | 0.0 | 2200.0 | 1346.28 | 1436.09 |
| 6 | 1100.0 | -1100.0 | 2273.72 | 2363.53 |
| 7 | 1100.0 | 1100.0 | 1646.23 | 1736.04 |

桩总反力= 14445.1 kN; 桩均反力= 2063.6 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 > = 2301.31(×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 > = 2601.26(×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 > = 1346.28(×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 > = 1673.82(×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 | 1719.51 (19) | 1162.61 (4) | 1959.01 (45) | 980.51 (44) |
| 2 | 2435.07 (18) | 1665.17 (5) | 2667.90 (44) | 1508.49 (45) |
| 3 | 1511.88 (21) | 712.65 (4) | 2172.88 (45) | 128.31 (44) |
| 4 | 1997.50 (14) | 1519.42 (3) | 1963.48 (42) | 1574.57 (43) |
| 5 | 2867.80 (18) | 1764.09 (5) | 3503.08 (44) | 1271.83 (45) |
| 6 | 1696.56 (19) | 1145.97 (4) | 1936.23 (45) | 963.49 (44) |
| 7 | 2412.75 (18) | 1647.46 (5) | 2650.87 (44) | 1485.70 (45) |

桩平均反力最大值1997.50 (非震)(Load 14)

桩平均反力最小值1519.42 (非震)(Load 3)

桩平均反力最大值1963.48 (震)(Load 42)

桩平均反力最小值1574.57 (震)(Load 43)

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2056.28 kN ：550 mm (Load:73)

桩 2: 抗力4241.26 kN 冲切力2211.07 kN ：550 mm (Load:99)

桩 3: 抗力4241.26 kN 冲切力3573.39 kN ：550 mm (Load:98)

桩 4: 抗力3003.04 kN 冲切力2948.18 kN ：550 mm (Load:72)

柱冲切计算：

抗力17912.76 kN 冲切力14443.09 kN ：950 mm Load：55

抗剪计算：

1左边： 抗力7933.77kN 剪力4842.90kN ：950mm (Load:55)

2右边： 抗力7933.77kN 剪力4785.83kN ：950mm (Load:55)

3上边： 抗力5640.15kN 剪力-16.54kN ：950mm (Load:98)

4下边： 抗力5640.15kN 剪力3573.39kN ：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3632.18 kN.m 计算钢筋面积2000 /m Load： 55

Y方向：弯矩962.71 kN.m 计算钢筋面积845 /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 16@100

Agy: HRB400 12@130