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

承台高：1800mm

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 | -1000 | 0 |
| 2 | 1000 | 0 |

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 | 550 | 550 | 175 | 0 | 0 |
| 外接柱 | 550 | 550 | 175 | 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

= 3.0× 24.0

= 72.0 kN

∑ = 2000000.0 ∑ = 0.0

当前荷载组合

| 【2】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=1991.3kN =-17.0kN.m =334.3kN.m =-46.3kN =42.3kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 828.52 | 864.52 | 满足 |
| 2 | 1000.0 | 0.0 | 1162.77 | 1198.77 | 满足 |

桩总反力= 2063.3 kN; 桩均反力= 1031.6 kN

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=1992.8kN =-18.9kN.m =318.6kN.m =-61.0kN =45.1kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 837.10 | 873.10 | 满足 |
| 2 | 1000.0 | 0.0 | 1155.69 | 1191.69 | 满足 |

桩总反力= 2064.8 kN; 桩均反力= 1032.4 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=2666.6kN =-24.1kN.m =447.5kN.m =-53.2kN =59.1kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 1109.54 | 1145.54 | 满足 |
| 2 | 1000.0 | 0.0 | 1557.03 | 1593.03 | 满足 |

桩总反力= 2738.6 kN; 桩均反力= 1369.3 kN

当前荷载组合

| 【15】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=2667.5kN =-25.3kN.m =438.1kN.m =-62.0kN =60.9kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 1114.69 | 1150.69 | 满足 |
| 2 | 1000.0 | 0.0 | 1552.78 | 1588.78 | 满足 |

桩总反力= 2739.5 kN; 桩均反力= 1369.7 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=2326.0kN =-15.0kN.m =427.8kN.m =-14.4kN =43.7kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 949.11 | 985.11 | 满足 |
| 2 | 1000.0 | 0.0 | 1376.92 | 1412.92 | 满足 |

桩总反力= 2398.0 kN; 桩均反力= 1199.0 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=2333.0kN =-27.7kN.m =341.4kN.m =-96.8kN =60.0kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 995.81 | 1031.81 | 满足 |
| 2 | 1000.0 | 0.0 | 1337.22 | 1373.22 | 满足 |

桩总反力= 2405.0 kN; 桩均反力= 1202.5 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=2337.3kN =-67.7kN.m =388.1kN.m =-57.7kN =99.5kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 974.60 | 1010.60 | 满足 |
| 2 | 1000.0 | 0.0 | 1362.74 | 1398.74 | 满足 |

桩总反力= 2409.3 kN; 桩均反力= 1204.7 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=2321.7kN =25.1kN.m =381.1kN.m =-53.6kN =4.2kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 970.33 | 1006.33 | 满足 |
| 2 | 1000.0 | 0.0 | 1351.39 | 1387.39 | 满足 |

桩总反力= 2393.7 kN; 桩均反力= 1196.9 kN

2、承台内力配筋计算

当前荷载组合

| 【54】SATWE基本组合:1.20\*恒+1.40\*活 |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=3335.4kN =-31.0kN.m =554.6kN.m =-69.9kN =75.3kN

承台及覆土重:

= 72.0×1.20= 86.4

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) |
| --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 1390.40 | 1433.60 |
| 2 | 1000.0 | 0.0 | 1945.02 | 1988.22 |

桩总反力= 3421.8 kN; 桩均反力= 1710.9 kN

3、承台板抗弯计算

X方向配筋计算：

= 1251.36\*1.00= 1251.36 X = -100. H = 1950.

= /(0.9\*\*)/YS = 1251.36/(0.9\*1950.0\*360.0)/1.0= 1980.6 /m

= 1069.76\*1.00= 1069.76 X = 450. H = 1950.

= /(0.9\*\*)/YS = 1069.76/(0.9\*1950.0\*360.0)/1.0= 1693.2 /m

= 1251.36\*1.00= 1251.36 X = -100. H = 1950.

= /(0.9\*\*)/YS = 1251.36/(0.9\*1950.0\*360.0)/1.0= 1980.6 /m

Y方向配筋计算：

计算的钢筋面积：

= 1981./m = 0./m

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=3350.7kN =-30.9kN.m =554.7kN.m =-76.3kN =75.0kN

承台及覆土重:

= 72.0×1.35= 97.2

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) |
| --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 1398.01 | 1446.61 |
| 2 | 1000.0 | 0.0 | 1952.72 | 2001.32 |

桩总反力= 3447.9 kN; 桩均反力= 1724.0 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

=1950. = 802. =0.359

= 2472.6 kN

= [1.75/(+1.0)]

=0.800\*[1.75/(0.359+1.0)]\* 977.\*1950.\*1.4329\*1.e-3

= 2813.2 kN

= min( , )

> = 1398.01 (\* 1.00) kN

2、右侧抗剪计算

=1950. = 350. =0.250

= 3071.4 kN

= [1.75/(+1.0)]

=0.800\*[1.75/(0.250+1.0)]\* 977.\*1950.\*1.4329\*1.e-3

= 3058.4 kN

= min( , )

> = 1952.72 (\* 1.00) kN

3、下侧抗剪计算

4、上侧抗剪计算

承台阶梯高度：

1阶高： 1800mm

3、承台板抗弯计算

X方向配筋计算：

= 1258.21\*1.00= 1258.21 X = -100. H = 1950.

= /(0.9\*\*)/YS = 1258.21/(0.9\*1950.0\*360.0)/1.0= 1991.5 /m

= 1074.00\*1.00= 1074.00 X = 450. H = 1950.

= /(0.9\*\*)/YS = 1074.00/(0.9\*1950.0\*360.0)/1.0= 1699.9 /m

= 1258.21\*1.00= 1258.21 X = -100. H = 1950.

= /(0.9\*\*)/YS = 1258.21/(0.9\*1950.0\*360.0)/1.0= 1991.5 /m

Y方向配筋计算：

计算的钢筋面积：

= 1991./m = 0./m

# 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 | 1150.69 (15) | 864.52 (2) | 1031.81 (43) | 985.11 (42) |
| 2 | 1593.03 (14) | 1191.69 (3) | 1412.92 (42) | 1373.22 (43) |

桩平均反力最大值1370.30 (非震)(Load 18)

桩平均反力最小值1030.70 (非震)(Load 5)

桩平均反力最大值1204.67 (震)(Load 44)

桩平均反力最小值1196.86 (震)(Load 45)

基本组合下承台冲切、剪切、配筋计算:

角桩冲切计算：

抗剪计算：

1边： 抗力2472.59kN 剪力1398.01kN ：1950mm (Load:55)

2边： 抗力3058.44kN 剪力1952.72kN ：1950mm (Load:55)

承台高度：

承台高1800

底板配筋计算：

X方向：弯矩1258.21 kN.m 计算钢筋面积2700 /m Load： 55

Y方向：弯矩0.00 kN.m 计算钢筋面积2700 /m Load： 54