桩承台计算\_序号84

# 一、设计资料

1、承台信息

承台底标高：-4.50m

承台上段高：200mm

承台下段高：1350mm

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 | 0 | 0 | 0 |
| 外接柱 | 550 | 550 | 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

= 3.0× 24.0

= 72.0 kN

∑ = 2000000.0 ∑ = 0.0

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=2331.2kN =-12.5kN.m =-12.8kN.m =-30.2kN =9.8kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 1172.02 | 1208.02 | 满足 |
| 2 | 1000.0 | 0.0 | 1159.17 | 1195.17 | 满足 |

桩总反力= 2403.2 kN; 桩均反力= 1201.6 kN

当前荷载组合

| 【10】SATWE标准组合:1.00\*恒+1.00\*风y左 |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=2332.8kN =-7.4kN.m =-18.7kN.m =-35.7kN =4.7kN

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 | 1175.74 | 1211.74 | 满足 |
| 2 | 1000.0 | 0.0 | 1157.03 | 1193.03 | 满足 |

桩总反力= 2404.8 kN; 桩均反力= 1202.4 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=3001.8kN =10.0kN.m =-14.6kN.m =-34.0kN =-14.8kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 1508.17 | 1544.17 | 满足 |
| 2 | 1000.0 | 0.0 | 1493.60 | 1529.60 | 满足 |

桩总反力= 3073.8 kN; 桩均反力= 1536.9 kN

当前荷载组合

| 【31】SATWE标准组合:1.00\*恒+1.00\*活-0.60\*风y左 |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=3000.8kN =6.9kN.m =-11.1kN.m =-30.7kN =-11.7kN

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 | 1505.94 | 1541.94 | 满足 |
| 2 | 1000.0 | 0.0 | 1494.89 | 1530.89 | 满足 |

桩总反力= 3072.8 kN; 桩均反力= 1536.4 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=2695.7kN =6.1kN.m =35.2kN.m =15.2kN =-11.2kN

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 | 1330.26 | 1366.26 | 满足 |
| 2 | 1000.0 | 0.0 | 1365.45 | 1401.45 | 满足 |

桩总反力= 2767.7 kN; 桩均反力= 1383.9 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=2642.5kN =-3.0kN.m =-62.6kN.m =-79.4kN =0.5kN

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 | 1352.57 | 1388.57 | 满足 |
| 2 | 1000.0 | 0.0 | 1289.97 | 1325.97 | 满足 |

桩总反力= 2714.5 kN; 桩均反力= 1357.3 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=2627.7kN =-45.5kN.m =-16.3kN.m =-34.7kN =44.0kN

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 | 1321.98 | 1357.98 | 满足 |
| 2 | 1000.0 | 0.0 | 1305.73 | 1341.73 | 满足 |

桩总反力= 2699.7 kN; 桩均反力= 1349.9 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=2710.5kN =48.5kN.m =-11.2kN.m =-29.5kN =-54.8kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 1360.85 | 1396.85 | 满足 |
| 2 | 1000.0 | 0.0 | 1349.70 | 1385.70 | 满足 |

桩总反力= 2782.5 kN; 桩均反力= 1391.3 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=3722.5kN =2.1kN.m =-17.9kN.m =-41.7kN =-7.6kN

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 | 1870.17 | 1913.37 |
| 2 | 1000.0 | 0.0 | 1852.31 | 1895.51 |

桩总反力= 3808.9 kN; 桩均反力= 1904.4 kN

3、承台板抗弯计算

X方向配筋计算：

= 1355.87\*1.00= 1355.87 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1355.87/(0.9\*1500.0\*360.0)/1.0= 2789.9 /m

= 1342.93\*1.00= 1342.93 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1342.93/(0.9\*1500.0\*360.0)/1.0= 2763.2 /m

= 1355.87\*1.00= 1355.87 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1355.87/(0.9\*1500.0\*360.0)/1.0= 2789.9 /m

Y方向配筋计算：

计算的钢筋面积：

= 2790./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=3801.4kN =2.1kN.m =-19.0kN.m =-44.5kN =-7.7kN

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 | 1910.21 | 1958.81 |
| 2 | 1000.0 | 0.0 | 1891.18 | 1939.78 |

桩总反力= 3898.6 kN; 桩均反力= 1949.3 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

=1500. = 802. =0.317

= 2142.5 kN

= [1.75/(+1.0)]

=0.855\*[1.75/(0.317+1.0)]\* 977.\*1500.\*1.4329\*1.e-3

= 2384.3 kN

= min( , )

> = 1910.21 (\* 1.00) kN

2、右侧抗剪计算

=1500. = 475. =0.317

= 2142.5 kN

= [1.75/(+1.0)]

=0.855\*[1.75/(0.317+1.0)]\* 977.\*1500.\*1.4329\*1.e-3

= 2384.3 kN

= min( , )

> = 1891.18 (\* 1.00) kN

3、下侧抗剪计算

4、上侧抗剪计算

c、承台抗剪计算

1、左侧抗剪计算

=1500. = 803. =0.350

= 2012.7 kN

= [1.75/(+1.0)]

=0.855\*[1.75/(0.350+1.0)]\* 977.\*1500.\*1.4329\*1.e-3

= 2325.4 kN

= min( , )

> = 1910.21 (\* 1.00) kN

2、右侧抗剪计算

=1500. = 525. =0.350

= 2012.7 kN

= [1.75/(+1.0)]

=0.855\*[1.75/(0.350+1.0)]\* 977.\*1500.\*1.4329\*1.e-3

= 2325.4 kN

= min( , )

> = 1891.18 (\* 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： 1350mm

2阶高： 200mm

3、承台板抗弯计算

X方向配筋计算：

= 1384.91\*1.00= 1384.91 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1384.91/(0.9\*1500.0\*360.0)/1.0= 2849.6 /m

= 1371.10\*1.00= 1371.10 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1371.10/(0.9\*1500.0\*360.0)/1.0= 2821.2 /m

= 1384.91\*1.00= 1384.91 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1384.91/(0.9\*1500.0\*360.0)/1.0= 2849.6 /m

Y方向配筋计算：

计算的钢筋面积：

= 2850./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 | 1544.17 (19) | 1208.02 (4) | 1396.85 (45) | 1357.98 (44) |
| 2 | 1530.89 (31) | 1193.03 (10) | 1401.45 (42) | 1325.97 (43) |

桩平均反力最大值1536.89 (非震)(Load 19)

桩平均反力最小值1201.59 (非震)(Load 4)

桩平均反力最大值1391.27 (震)(Load 45)

桩平均反力最小值1349.85 (震)(Load 44)

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2012.67kN 剪力1910.21kN ：1500mm (Load:55)

2边： 抗力2012.67kN 剪力1891.18kN ：1500mm (Load:55)

承台高度：

一阶高1350 二阶高200

底板配筋计算：

X方向：弯矩1384.91 kN.m 计算钢筋面积2850 /m Load： 55

Y方向：弯矩0.00 kN.m 计算钢筋面积2208 /m Load： 54