桩承台计算\_序号94

# 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=2327.0kN =-11.9kN.m =9.3kN.m =25.4kN =8.5kN

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 | 1158.82 | 1194.82 | 满足 |
| 2 | 1000.0 | 0.0 | 1168.16 | 1204.16 | 满足 |

桩总反力= 2399.0 kN; 桩均反力= 1199.5 kN

当前荷载组合

| 【12】SATWE标准组合:1.00\*恒+1.00\*风y右 |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=2328.6kN =-6.8kN.m =15.2kN.m =30.9kN =3.4kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 1156.70 | 1192.70 | 满足 |
| 2 | 1000.0 | 0.0 | 1171.87 | 1207.87 | 满足 |

桩总反力= 2400.6 kN; 桩均反力= 1200.3 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=2999.3kN =10.5kN.m =9.9kN.m =27.3kN =-15.9kN

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 | 1494.68 | 1530.68 | 满足 |
| 2 | 1000.0 | 0.0 | 1504.58 | 1540.58 | 满足 |

桩总反力= 3071.3 kN; 桩均反力= 1535.6 kN

当前荷载组合

| 【35】SATWE标准组合:1.00\*恒+1.00\*活-0.60\*风y右 |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=2998.3kN =7.4kN.m =6.4kN.m =24.0kN =-12.9kN

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 | 1495.95 | 1531.95 | 满足 |
| 2 | 1000.0 | 0.0 | 1502.35 | 1538.35 | 满足 |

桩总反力= 3070.3 kN; 桩均反力= 1535.2 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=2638.8kN =-3.1kN.m =58.4kN.m =73.4kN =-0.1kN

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 | 1290.19 | 1326.19 | 满足 |
| 2 | 1000.0 | 0.0 | 1348.62 | 1384.62 | 满足 |

桩总反力= 2710.8 kN; 桩均反力= 1355.4 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=2692.8kN =7.2kN.m =-39.2kN.m =-20.8kN =-13.1kN

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 | 1366.01 | 1402.01 | 满足 |
| 2 | 1000.0 | 0.0 | 1326.78 | 1362.78 | 满足 |

桩总反力= 2764.8 kN; 桩均反力= 1382.4 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=2624.8kN =-44.4kN.m =7.2kN.m =28.7kN =42.1kN

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 | 1308.84 | 1344.84 | 满足 |
| 2 | 1000.0 | 0.0 | 1316.00 | 1352.00 | 满足 |

桩总反力= 2696.8 kN; 桩均反力= 1348.4 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=2706.8kN =48.5kN.m =12.0kN.m =23.9kN =-55.3kN

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 | 1347.36 | 1383.36 | 满足 |
| 2 | 1000.0 | 0.0 | 1359.40 | 1395.40 | 满足 |

桩总反力= 2778.8 kN; 桩均反力= 1389.4 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=3719.6kN =2.7kN.m =12.1kN.m =33.3kN =-9.1kN

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 | 1853.78 | 1896.98 |
| 2 | 1000.0 | 0.0 | 1865.86 | 1909.06 |

桩总反力= 3806.0 kN; 桩均反力= 1903.0 kN

3、承台板抗弯计算

X方向配筋计算：

= 1343.99\*1.00= 1343.99 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1343.99/(0.9\*1500.0\*360.0)/1.0= 2765.4 /m

= 1352.75\*1.00= 1352.75 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1352.75/(0.9\*1500.0\*360.0)/1.0= 2783.4 /m

= 1352.75\*1.00= 1352.75 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1352.75/(0.9\*1500.0\*360.0)/1.0= 2783.4 /m

Y方向配筋计算：

计算的钢筋面积：

= 2783./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=3797.3kN =2.8kN.m =13.2kN.m =36.2kN =-9.4kN

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 | 1892.08 | 1940.68 |
| 2 | 1000.0 | 0.0 | 1905.26 | 1953.86 |

桩总反力= 3894.5 kN; 桩均反力= 1947.3 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( , )

> = 1892.08 (\* 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( , )

> = 1905.26 (\* 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( , )

> = 1892.08 (\* 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( , )

> = 1905.26 (\* 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：

= 1371.76\*1.00= 1371.76 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1371.76/(0.9\*1500.0\*360.0)/1.0= 2822.5 /m

= 1381.31\*1.00= 1381.31 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1381.31/(0.9\*1500.0\*360.0)/1.0= 2842.2 /m

= 1381.31\*1.00= 1381.31 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1381.31/(0.9\*1500.0\*360.0)/1.0= 2842.2 /m

Y方向配筋计算：

计算的钢筋面积：

= 2842./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 | 1531.95 (35) | 1192.70 (12) | 1402.01 (43) | 1326.19 (42) |
| 2 | 1540.58 (19) | 1204.16 (4) | 1395.40 (45) | 1352.00 (44) |

桩平均反力最大值1535.63 (非震)(Load 19)

桩平均反力最小值1199.49 (非震)(Load 4)

桩平均反力最大值1389.38 (震)(Load 45)

桩平均反力最小值1348.42 (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1892.08kN ：1500mm (Load:55)

2边： 抗力2012.67kN 剪力1905.26kN ：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1381.31 kN.m 计算钢筋面积2842 /m Load： 55

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