桩承台计算\_序号50

# 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

| 【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=1963.4kN =-20.6kN.m =36.4kN.m =80.5kN =50.6kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -1000.0 | 0.0 | 963.48 | 999.48 | 满足 |
| 2 | 1000.0 | 0.0 | 999.87 | 1035.87 | 满足 |

桩总反力= 2035.4 kN; 桩均反力= 1017.7 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=1969.1kN =-21.1kN.m =20.4kN.m =65.6kN =51.2kN

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 | 974.36 | 1010.36 | 满足 |
| 2 | 1000.0 | 0.0 | 994.75 | 1030.75 | 满足 |

桩总反力= 2041.1 kN; 桩均反力= 1020.6 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=2645.5kN =-28.2kN.m =34.9kN.m =82.2kN =69.0kN

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 | 1305.27 | 1341.27 | 满足 |
| 2 | 1000.0 | 0.0 | 1340.19 | 1376.19 | 满足 |

桩总反力= 2717.5 kN; 桩均反力= 1358.7 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=2648.9kN =-28.5kN.m =25.3kN.m =73.3kN =69.4kN

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 | 1311.80 | 1347.80 | 满足 |
| 2 | 1000.0 | 0.0 | 1337.11 | 1373.11 | 满足 |

桩总反力= 2720.9 kN; 桩均反力= 1360.5 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=2291.7kN =-21.9kN.m =73.3kN.m =117.2kN =57.2kN

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 | 1109.23 | 1145.23 | 满足 |
| 2 | 1000.0 | 0.0 | 1182.50 | 1218.50 | 满足 |

桩总反力= 2363.7 kN; 桩均反力= 1181.9 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=2321.7kN =-27.3kN.m =-14.8kN.m =33.7kN =62.9kN

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 | 1168.23 | 1204.23 | 满足 |
| 2 | 1000.0 | 0.0 | 1153.46 | 1189.46 | 满足 |

桩总反力= 2393.7 kN; 桩均反力= 1196.8 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=3312.8kN =-35.6kN.m =36.5kN.m =94.3kN =86.7kN

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 | 1638.17 | 1681.37 |
| 2 | 1000.0 | 0.0 | 1674.65 | 1717.85 |

桩总反力= 3399.2 kN; 桩均反力= 1699.6 kN

3、承台板抗弯计算

X方向配筋计算：

= 1187.67\*1.00= 1187.67 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1187.67/(0.9\*1500.0\*360.0)/1.0= 2443.8 /m

= 1214.12\*1.00= 1214.12 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1214.12/(0.9\*1500.0\*360.0)/1.0= 2498.2 /m

= 1214.12\*1.00= 1214.12 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1214.12/(0.9\*1500.0\*360.0)/1.0= 2498.2 /m

Y方向配筋计算：

计算的钢筋面积：

= 2498./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=3321.8kN =-35.5kN.m =40.0kN.m =103.3kN =86.6kN

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 | 1640.87 | 1689.47 |
| 2 | 1000.0 | 0.0 | 1680.88 | 1729.48 |

桩总反力= 3418.9 kN; 桩均反力= 1709.5 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( , )

> = 1640.87 (\* 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( , )

> = 1680.88 (\* 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( , )

> = 1640.87 (\* 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( , )

> = 1680.88 (\* 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：

= 1189.63\*1.00= 1189.63 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1189.63/(0.9\*1500.0\*360.0)/1.0= 2447.8 /m

= 1218.64\*1.00= 1218.64 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1218.64/(0.9\*1500.0\*360.0)/1.0= 2507.5 /m

= 1218.64\*1.00= 1218.64 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1218.64/(0.9\*1500.0\*360.0)/1.0= 2507.5 /m

Y方向配筋计算：

计算的钢筋面积：

= 2507./m = 0./m

当前荷载组合

| 【69】SATWE基本组合:1.20\*恒+1.40\*活-0.84\*风x |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=3315.2kN =-35.8kN.m =29.8kN.m =88.0kN =87.0kN

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 | 1642.74 | 1685.94 |
| 2 | 1000.0 | 0.0 | 1672.50 | 1715.70 |

桩总反力= 3401.6 kN; 桩均反力= 1700.8 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( , )

> = 1642.74 (\* 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( , )

> = 1672.50 (\* 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( , )

> = 1642.74 (\* 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( , )

> = 1672.50 (\* 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

# 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 | 1347.80 (15) | 999.48 (2) | 1204.23 (43) | 1145.23 (42) |
| 2 | 1376.19 (14) | 1030.75 (3) | 1218.50 (42) | 1189.46 (43) |

桩平均反力最大值1360.46 (非震)(Load 15)

桩平均反力最小值1017.68 (非震)(Load 2)

桩平均反力最大值1196.84 (震)(Load 43)

桩平均反力最小值1181.87 (震)(Load 42)

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1642.74kN ：1500mm (Load:69)

2边： 抗力2012.67kN 剪力1680.88kN ：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1218.64 kN.m 计算钢筋面积2507 /m Load： 55

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