桩承台计算\_序号86

# 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=2039.0kN =2.4kN.m =40.1kN.m =88.0kN =-7.1kN

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 | 999.49 | 1035.49 | 满足 |
| 2 | 1000.0 | 0.0 | 1039.55 | 1075.55 | 满足 |

桩总反力= 2111.0 kN; 桩均反力= 1055.5 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=2038.8kN =-11.5kN.m =30.6kN.m =78.7kN =7.5kN

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 | 1004.11 | 1040.11 | 满足 |
| 2 | 1000.0 | 0.0 | 1034.73 | 1070.73 | 满足 |

桩总反力= 2110.8 kN; 桩均反力= 1055.4 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=2614.6kN =2.5kN.m =28.6kN.m =82.7kN =-8.3kN

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 | 1292.98 | 1328.98 | 满足 |
| 2 | 1000.0 | 0.0 | 1321.58 | 1357.58 | 满足 |

桩总反力= 2686.6 kN; 桩均反力= 1343.3 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=2614.7kN =10.9kN.m =34.3kN.m =88.3kN =-17.1kN

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 | 1290.21 | 1326.21 | 满足 |
| 2 | 1000.0 | 0.0 | 1324.47 | 1360.47 | 满足 |

桩总反力= 2686.7 kN; 桩均反力= 1343.3 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=2268.0kN =5.1kN.m =82.1kN.m =132.7kN =-10.6kN

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 | 1092.98 | 1128.98 | 满足 |
| 2 | 1000.0 | 0.0 | 1175.04 | 1211.04 | 满足 |

桩总反力= 2340.0 kN; 桩均反力= 1170.0 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=2390.7kN =-0.3kN.m =-17.2kN.m =34.4kN =-4.8kN

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 | 1203.92 | 1239.92 | 满足 |
| 2 | 1000.0 | 0.0 | 1186.73 | 1222.73 | 满足 |

桩总反力= 2462.7 kN; 桩均反力= 1231.3 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=2289.0kN =-44.5kN.m =29.9kN.m =81.0kN =41.7kN

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 | 1129.56 | 1165.56 | 满足 |
| 2 | 1000.0 | 0.0 | 1159.46 | 1195.46 | 满足 |

桩总反力= 2361.0 kN; 桩均反力= 1180.5 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=2369.7kN =49.4kN.m =35.0kN.m =86.1kN =-57.0kN

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 | 1167.34 | 1203.34 | 满足 |
| 2 | 1000.0 | 0.0 | 1202.31 | 1238.31 | 满足 |

桩总反力= 2441.7 kN; 桩均反力= 1220.8 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=3239.4kN =3.2kN.m =41.9kN.m =107.9kN =-10.3kN

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 | 1598.77 | 1641.97 |
| 2 | 1000.0 | 0.0 | 1640.63 | 1683.83 |

桩总反力= 3325.8 kN; 桩均反力= 1662.9 kN

3、承台板抗弯计算

X方向配筋计算：

= 1159.11\*1.00= 1159.11 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1159.11/(0.9\*1500.0\*360.0)/1.0= 2385.0 /m

= 1189.46\*1.00= 1189.46 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1189.46/(0.9\*1500.0\*360.0)/1.0= 2447.4 /m

= 1189.46\*1.00= 1189.46 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1189.46/(0.9\*1500.0\*360.0)/1.0= 2447.4 /m

Y方向配筋计算：

计算的钢筋面积：

= 2447./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=3314.0kN =3.4kN.m =44.9kN.m =115.7kN =-10.8kN

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 | 1634.52 | 1683.12 |
| 2 | 1000.0 | 0.0 | 1679.43 | 1728.03 |

桩总反力= 3411.2 kN; 桩均反力= 1705.6 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( , )

> = 1634.52 (\* 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( , )

> = 1679.43 (\* 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( , )

> = 1634.52 (\* 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( , )

> = 1679.43 (\* 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：

= 1185.03\*1.00= 1185.03 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1185.03/(0.9\*1500.0\*360.0)/1.0= 2438.3 /m

= 1217.59\*1.00= 1217.59 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1217.59/(0.9\*1500.0\*360.0)/1.0= 2505.3 /m

= 1217.59\*1.00= 1217.59 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1217.59/(0.9\*1500.0\*360.0)/1.0= 2505.3 /m

Y方向配筋计算：

计算的钢筋面积：

= 2505./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 | 1328.98 (15) | 1035.49 (2) | 1239.92 (43) | 1128.98 (42) |
| 2 | 1360.47 (19) | 1070.73 (4) | 1238.31 (45) | 1195.46 (44) |

桩平均反力最大值1344.21 (非震)(Load 35)

桩平均反力最小值1053.98 (非震)(Load 12)

桩平均反力最大值1231.33 (震)(Load 43)

桩平均反力最小值1170.01 (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1634.52kN ：1500mm (Load:55)

2边： 抗力2012.67kN 剪力1679.43kN ：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1217.59 kN.m 计算钢筋面积2505 /m Load： 55

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