桩承台计算\_序号92

# 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

| 【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=2047.9kN =2.6kN.m =-43.0kN.m =-91.4kN =-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 | 1045.48 | 1081.48 | 满足 |
| 2 | 1000.0 | 0.0 | 1002.44 | 1038.44 | 满足 |

桩总反力= 2119.9 kN; 桩均反力= 1060.0 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=2047.9kN =-11.4kN.m =-33.6kN.m =-82.1kN =7.2kN

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 | 1040.72 | 1076.72 | 满足 |
| 2 | 1000.0 | 0.0 | 1007.14 | 1043.14 | 满足 |

桩总反力= 2119.9 kN; 桩均反力= 1059.9 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=2623.1kN =2.6kN.m =-32.1kN.m =-86.6kN =-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 | 1327.63 | 1363.63 | 满足 |
| 2 | 1000.0 | 0.0 | 1295.52 | 1331.52 | 满足 |

桩总反力= 2695.1 kN; 桩均反力= 1347.6 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=2623.2kN =11.0kN.m =-37.8kN.m =-92.2kN =-17.3kN

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 | 1330.48 | 1366.48 | 满足 |
| 2 | 1000.0 | 0.0 | 1292.70 | 1328.70 | 满足 |

桩总反力= 2695.2 kN; 桩均反力= 1347.6 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=2398.9kN =-0.5kN.m =14.0kN.m =-38.0kN =-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 | 1192.45 | 1228.45 | 满足 |
| 2 | 1000.0 | 0.0 | 1206.41 | 1242.41 | 满足 |

桩总反力= 2470.9 kN; 桩均反力= 1235.4 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=2277.2kN =5.7kN.m =-85.3kN.m =-136.3kN =-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 | 1181.28 | 1217.28 | 满足 |
| 2 | 1000.0 | 0.0 | 1095.96 | 1131.96 | 满足 |

桩总反力= 2349.2 kN; 桩均反力= 1174.6 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=2297.4kN =-44.1kN.m =-38.2kN.m =-89.7kN =41.1kN

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 | 1167.83 | 1203.83 | 满足 |
| 2 | 1000.0 | 0.0 | 1129.60 | 1165.60 | 满足 |

桩总反力= 2369.4 kN; 桩均反力= 1184.7 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=2378.7kN =49.2kN.m =-33.1kN.m =-84.6kN =-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 | 1205.90 | 1241.90 | 满足 |
| 2 | 1000.0 | 0.0 | 1172.77 | 1208.77 | 满足 |

桩总反力= 2450.7 kN; 桩均反力= 1225.3 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=3249.8kN =3.3kN.m =-46.2kN.m =-112.6kN =-10.7kN

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 | 1647.96 | 1691.16 |
| 2 | 1000.0 | 0.0 | 1601.79 | 1644.99 |

桩总反力= 3336.2 kN; 桩均反力= 1668.1 kN

3、承台板抗弯计算

X方向配筋计算：

= 1194.77\*1.00= 1194.77 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1194.77/(0.9\*1500.0\*360.0)/1.0= 2458.4 /m

= 1161.30\*1.00= 1161.30 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1161.30/(0.9\*1500.0\*360.0)/1.0= 2389.5 /m

= 1194.77\*1.00= 1194.77 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1194.77/(0.9\*1500.0\*360.0)/1.0= 2458.4 /m

Y方向配筋计算：

计算的钢筋面积：

= 2458./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=3325.7kN =3.6kN.m =-49.4kN.m =-120.7kN =-11.2kN

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 | 1687.56 | 1736.16 |
| 2 | 1000.0 | 0.0 | 1638.11 | 1686.71 |

桩总反力= 3422.9 kN; 桩均反力= 1711.4 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( , )

> = 1687.56 (\* 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( , )

> = 1638.11 (\* 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( , )

> = 1687.56 (\* 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( , )

> = 1638.11 (\* 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：

= 1223.48\*1.00= 1223.48 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1223.48/(0.9\*1500.0\*360.0)/1.0= 2517.5 /m

= 1187.63\*1.00= 1187.63 X = 275. H = 1500.

= /(0.9\*\*)/YS = 1187.63/(0.9\*1500.0\*360.0)/1.0= 2443.7 /m

= 1223.48\*1.00= 1223.48 X = -275. H = 1500.

= /(0.9\*\*)/YS = 1223.48/(0.9\*1500.0\*360.0)/1.0= 2517.5 /m

Y方向配筋计算：

计算的钢筋面积：

= 2517./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 | 1366.48 (19) | 1076.72 (4) | 1241.90 (45) | 1203.83 (44) |
| 2 | 1331.52 (14) | 1038.44 (3) | 1242.41 (42) | 1131.96 (43) |

桩平均反力最大值1348.47 (非震)(Load 31)

桩平均反力最小值1058.47 (非震)(Load 10)

桩平均反力最大值1235.43 (震)(Load 42)

桩平均反力最小值1174.62 (震)(Load 43)

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1687.56kN ：1500mm (Load:55)

2边： 抗力2012.67kN 剪力1638.11kN ：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1223.48 kN.m 计算钢筋面积2517 /m Load： 55

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