桩承台计算\_序号82

# 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：1400mm

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 | 0 | -1000 |
| 2 | 0 | 1000 |

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

∑ = 0.0 ∑ = 2000000.0

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=2349.1kN =-31.2kN.m =-15.7kN.m =-37.3kN =56.7kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | 0.0 | -1000.0 | 1158.94 | 1194.94 | 满足 |
| 2 | 0.0 | 1000.0 | 1190.14 | 1226.14 | 满足 |

桩总反力= 2421.1 kN; 桩均反力= 1210.5 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=3041.2kN =-9.7kN.m =-17.6kN.m =-41.7kN =34.4kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | 0.0 | -1000.0 | 1515.75 | 1551.75 | 满足 |
| 2 | 0.0 | 1000.0 | 1525.44 | 1561.44 | 满足 |

桩总反力= 3113.2 kN; 桩均反力= 1556.6 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=2544.0kN =-65.7kN.m =-19.1kN.m =-41.8kN =94.3kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | 0.0 | -1000.0 | 1239.15 | 1275.15 | 满足 |
| 2 | 0.0 | 1000.0 | 1304.85 | 1340.85 | 满足 |

桩总反力= 2616.0 kN; 桩均反力= 1308.0 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=2867.0kN =30.4kN.m =-14.2kN.m =-37.1kN =-9.2kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | 0.0 | -1000.0 | 1448.74 | 1484.74 | 满足 |
| 2 | 0.0 | 1000.0 | 1418.30 | 1454.30 | 满足 |

桩总反力= 2939.0 kN; 桩均反力= 1469.5 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=3733.8kN =-21.9kN.m =-21.5kN.m =-50.8kN =52.6kN

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 | 0.0 | -1000.0 | 1855.95 | 1899.15 |
| 2 | 0.0 | 1000.0 | 1877.89 | 1921.09 |

桩总反力= 3820.2 kN; 桩均反力= 1910.1 kN

3、承台板抗弯计算

X方向配筋计算：

Y方向配筋计算：

= 1345.56\*1.00= 1345.56 Y = -275. H = 1550.

= /(0.9\*\*)/XS = 1345.56/(0.9\*1550.0\*360.0)/1.0= 2679.3 /m

= 1361.47\*1.00= 1361.47 Y = 275. H = 1550.

= /(0.9\*\*)/XS = 1361.47/(0.9\*1550.0\*360.0)/1.0= 2711.0 /m

= 1361.47\*1.00= 1361.47 Y = 275. H = 1550.

= /(0.9\*\*)/XS = 1361.47/(0.9\*1550.0\*360.0)/1.0= 2711.0 /m

计算的钢筋面积：

= 0./m = 2711./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=3838.2kN =-24.1kN.m =-23.1kN.m =-54.6kN =58.0kN

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 | 0.0 | -1000.0 | 1907.05 | 1955.65 |
| 2 | 0.0 | 1000.0 | 1931.15 | 1979.75 |

桩总反力= 3935.4 kN; 桩均反力= 1967.7 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

2、右侧抗剪计算

3、下侧抗剪计算

=1550. = 475. =0.306

= 2250.3 kN

= [1.75/(+1.0)]

=0.848\*[1.75/(0.306+1.0)]\* 977.\*1550.\*1.4329\*1.e-3

= 2464.7 kN

= min( , )

> = 1907.05 (\* 1.00) kN

4、上侧抗剪计算

=1550. = 475. =0.306

= 2250.3 kN

= [1.75/(+1.0)]

=0.848\*[1.75/(0.306+1.0)]\* 977.\*1550.\*1.4329\*1.e-3

= 2464.7 kN

= min( , )

> = 1931.15 (\* 1.00) kN

c、承台抗剪计算

1、左侧抗剪计算

2、右侧抗剪计算

3、下侧抗剪计算

=1550. = 525. =0.339

= 2115.6 kN

= [1.75/(+1.0)]

=0.848\*[1.75/(0.339+1.0)]\* 977.\*1550.\*1.4329\*1.e-3

= 2405.3 kN

= min( , )

> = 1907.05 (\* 1.00) kN

4、上侧抗剪计算

=1550. = 525. =0.339

= 2115.6 kN

= [1.75/(+1.0)]

=0.848\*[1.75/(0.339+1.0)]\* 977.\*1550.\*1.4329\*1.e-3

= 2405.3 kN

= min( , )

> = 1931.15 (\* 1.00) kN

承台阶梯高度：

1阶高： 1400mm

2阶高： 200mm

3、承台板抗弯计算

X方向配筋计算：

Y方向配筋计算：

= 1382.61\*1.00= 1382.61 Y = -275. H = 1550.

= /(0.9\*\*)/XS = 1382.61/(0.9\*1550.0\*360.0)/1.0= 2753.1 /m

= 1400.08\*1.00= 1400.08 Y = 275. H = 1550.

= /(0.9\*\*)/XS = 1400.08/(0.9\*1550.0\*360.0)/1.0= 2787.9 /m

= 1400.08\*1.00= 1400.08 Y = 275. H = 1550.

= /(0.9\*\*)/XS = 1400.08/(0.9\*1550.0\*360.0)/1.0= 2787.9 /m

计算的钢筋面积：

= 0./m = 2788./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 | 1551.75 (19) | 1194.94 (4) | 1484.74 (45) | 1275.15 (44) |
| 2 | 1561.44 (19) | 1226.14 (4) | 1454.30 (45) | 1340.85 (44) |

桩平均反力最大值1556.59 (非震)(Load 19)

桩平均反力最小值1210.54 (非震)(Load 4)

桩平均反力最大值1469.52 (震)(Load 45)

桩平均反力最小值1308.00 (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：

承台高度：

一阶高1400 二阶高200

底板配筋计算：

X方向：弯矩0.00 kN.m 计算钢筋面积2283 /m Load： 54

Y方向：弯矩1400.08 kN.m 计算钢筋面积2788 /m Load： 55