桩承台计算\_序号79

# 一、设计资料

1、承台信息

承台底标高：-4.50m

承台上段高：550mm

承台下段高：850mm

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 | -750 | 0 |
| 2 | 750 | 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 | 700 | 700 | 0 | 0 | 0 |
| 外接柱 | 700 | 700 | 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

= 4.5× 24.0

= 108.0 kN

∑ = 1125000.0 ∑ = 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=3422.5kN =-31.8kN.m =8.8kN.m =6.1kN =6.3kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -750.0 | 0.0 | 1705.42 | 1759.42 | 满足 |
| 2 | 750.0 | 0.0 | 1717.12 | 1771.12 | 满足 |

桩总反力= 3530.5 kN; 桩均反力= 1765.3 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=4645.8kN =38.5kN.m =10.6kN.m =7.7kN =-17.9kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -750.0 | 0.0 | 2315.81 | 2369.81 | 满足 |
| 2 | 750.0 | 0.0 | 2330.01 | 2384.01 | 满足 |

桩总反力= 4753.8 kN; 桩均反力= 2376.9 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=3345.6kN =-124.6kN.m =2.5kN.m =4.4kN =36.4kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -750.0 | 0.0 | 1671.17 | 1725.17 | 满足 |
| 2 | 750.0 | 0.0 | 1674.44 | 1728.44 | 满足 |

桩总反力= 3453.6 kN; 桩均反力= 1726.8 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=4814.3kN =148.0kN.m =16.8kN.m =9.4kN =-53.6kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | -750.0 | 0.0 | 2395.91 | 2449.91 | 满足 |
| 2 | 750.0 | 0.0 | 2418.35 | 2472.35 | 满足 |

桩总反力= 4922.3 kN; 桩均反力= 2461.1 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=5581.8kN =16.8kN.m =13.5kN.m =9.6kN =-12.1kN

承台及覆土重:

= 108.0×1.20= 129.6

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) |
| --- | --- | --- | --- | --- |
| 1 | -750.0 | 0.0 | 2781.89 | 2846.69 |
| 2 | 750.0 | 0.0 | 2799.87 | 2864.67 |

桩总反力= 5711.4 kN; 桩均反力= 2855.7 kN

3、承台板抗弯计算

X方向配筋计算：

= 1112.76\*1.00= 1112.76 X = -350. H = 1350.

= /(0.9\*\*)/YS = 1112.76/(0.9\*1350.0\*360.0)/1.5= 1696.0 /m

= 1119.95\*1.00= 1119.95 X = 350. H = 1350.

= /(0.9\*\*)/YS = 1119.95/(0.9\*1350.0\*360.0)/1.5= 1707.0 /m

= 1119.95\*1.00= 1119.95 X = 350. H = 1350.

= /(0.9\*\*)/YS = 1119.95/(0.9\*1350.0\*360.0)/1.5= 1707.0 /m

Y方向配筋计算：

计算的钢筋面积：

= 1707./m = 0./m

当前荷载组合

| 【73】SATWE基本组合:1.20\*恒+1.40\*活-0.84\*风y |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=5773.9kN =51.9kN.m =13.2kN.m =9.6kN =-23.6kN

承台及覆土重:

= 108.0×1.20= 129.6

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) |
| --- | --- | --- | --- | --- |
| 1 | -750.0 | 0.0 | 2878.14 | 2942.94 |
| 2 | 750.0 | 0.0 | 2895.76 | 2960.56 |

桩总反力= 5903.5 kN; 桩均反力= 2951.7 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

=1350. = 552. =0.250

= 3117.9 kN

= [1.75/(+1.0)]

=0.877\*[1.75/(0.250+1.0)]\*1357.\*1350.\*1.4329\*1.e-3

= 3225.3 kN

= min( , )

> = 2878.14 (\* 1.00) kN

2、右侧抗剪计算

=1350. = 150. =0.250

= 3117.9 kN

= [1.75/(+1.0)]

=0.877\*[1.75/(0.250+1.0)]\*1357.\*1350.\*1.4329\*1.e-3

= 3225.3 kN

= min( , )

> = 2895.76 (\* 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

=1350. = 553. =0.250

= 3117.9 kN

= [1.75/(+1.0)]

=0.877\*[1.75/(0.250+1.0)]\*1357.\*1350.\*1.4329\*1.e-3

= 3225.3 kN

= min( , )

> = 2878.14 (\* 1.00) kN

2、右侧抗剪计算

=1350. = 200. =0.250

= 3117.9 kN

= [1.75/(+1.0)]

=0.877\*[1.75/(0.250+1.0)]\*1357.\*1350.\*1.4329\*1.e-3

= 3225.3 kN

= min( , )

> = 2895.76 (\* 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： 850mm

2阶高： 550mm

3、承台板抗弯计算

X方向配筋计算：

= 1151.26\*1.00= 1151.26 X = -350. H = 1350.

= /(0.9\*\*)/YS = 1151.26/(0.9\*1350.0\*360.0)/1.5= 1754.7 /m

= 1158.30\*1.00= 1158.30 X = 350. H = 1350.

= /(0.9\*\*)/YS = 1158.30/(0.9\*1350.0\*360.0)/1.5= 1765.4 /m

= 1158.30\*1.00= 1158.30 X = 350. H = 1350.

= /(0.9\*\*)/YS = 1158.30/(0.9\*1350.0\*360.0)/1.5= 1765.4 /m

Y方向配筋计算：

计算的钢筋面积：

= 1765./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 | 2369.81 (19) | 1759.42 (4) | 2449.91 (45) | 1725.17 (44) |
| 2 | 2384.01 (19) | 1771.12 (4) | 2472.35 (45) | 1728.44 (44) |

桩平均反力最大值2376.91 (非震)(Load 19)

桩平均反力最小值1765.27 (非震)(Load 4)

桩平均反力最大值2461.13 (震)(Load 45)

桩平均反力最小值1726.80 (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3117.86kN 剪力2878.14kN ：1350mm (Load:73)

2边： 抗力3117.86kN 剪力2895.76kN ：1350mm (Load:73)

承台高度：

一阶高850 二阶高550

底板配筋计算：

X方向：弯矩1158.30 kN.m 计算钢筋面积1908 /m Load： 73

Y方向：弯矩0.00 kN.m 计算钢筋面积1798 /m Load： 54