桩承台计算\_序号104

# 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：800mm

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 | -750 |
| 2 | 0 | 750 |

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

∑ = 0.0 ∑ = 1125000.0

当前荷载组合

| 【5】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=2229.0kN =60.1kN.m =7.9kN.m =5.7kN =-26.8kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | 0.0 | -750.0 | 1154.57 | 1208.57 | 满足 |
| 2 | 0.0 | 750.0 | 1074.39 | 1128.39 | 满足 |

桩总反力= 2337.0 kN; 桩均反力= 1168.5 kN

当前荷载组合

| 【18】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=3667.5kN =-5.7kN.m =3.2kN.m =2.3kN =-5.3kN

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 | -750.0 | 1829.94 | 1883.94 | 满足 |
| 2 | 0.0 | 750.0 | 1837.59 | 1891.59 | 满足 |

桩总反力= 3775.5 kN; 桩均反力= 1887.8 kN

当前荷载组合

| 【20】SATWE标准组合:1.00\*恒+1.00\*风y+0.70\*活 |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=3662.9kN =-25.4kN.m =0.4kN.m =0.3kN =2.2kN

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 | -750.0 | 1814.52 | 1868.52 | 满足 |
| 2 | 0.0 | 750.0 | 1848.37 | 1902.37 | 满足 |

桩总反力= 3770.9 kN; 桩均反力= 1885.4 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=4270.5kN =-121.5kN.m =-10.1kN.m =-5.8kN =35.0kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | 0.0 | -750.0 | 2054.24 | 2108.24 | 满足 |
| 2 | 0.0 | 750.0 | 2216.26 | 2270.26 | 满足 |

桩总反力= 4378.5 kN; 桩均反力= 2189.2 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=1820.0kN =158.0kN.m =19.2kN.m =12.5kN =-60.7kN

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 | -750.0 | 1015.36 | 1069.36 | 满足 |
| 2 | 0.0 | 750.0 | 804.69 | 858.69 | 满足 |

桩总反力= 1928.0 kN; 桩均反力= 964.0 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=4184.2kN =26.5kN.m =7.9kN.m =5.7kN =-18.5kN

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 | 0.0 | -750.0 | 2109.77 | 2174.57 |
| 2 | 0.0 | 750.0 | 2074.41 | 2139.21 |

桩总反力= 4313.8 kN; 桩均反力= 2156.9 kN

3、承台板抗弯计算

X方向配筋计算：

Y方向配筋计算：

= 843.91\*1.00= 843.91 Y = -350. H = 950.

= /(0.9\*\*)/XS = 843.91/(0.9\* 950.0\*360.0)/1.5= 1827.8 /m

= 829.77\*1.00= 829.77 Y = 350. H = 950.

= /(0.9\*\*)/XS = 829.77/(0.9\* 950.0\*360.0)/1.5= 1797.2 /m

= 843.91\*1.00= 843.91 Y = -350. H = 950.

= /(0.9\*\*)/XS = 843.91/(0.9\* 950.0\*360.0)/1.5= 1827.8 /m

计算的钢筋面积：

= 0./m = 1828./m

当前荷载组合

| 【72】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=4591.7kN =-11.1kN.m =3.9kN.m =2.8kN =-5.2kN

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 | 0.0 | -750.0 | 2288.46 | 2353.26 |
| 2 | 0.0 | 750.0 | 2303.26 | 2368.06 |

桩总反力= 4721.3 kN; 桩均反力= 2360.7 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

= 950. = 150. =0.250

= 2386.0 kN

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*1426.\* 950.\*1.4329\*1.e-3

= 2603.9 kN

= min( , )

> = 2288.46 (\* 1.00) kN

4、上侧抗剪计算

= 950. = 150. =0.250

= 2386.0 kN

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*1426.\* 950.\*1.4329\*1.e-3

= 2603.9 kN

= min( , )

> = 2303.26 (\* 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

= 950. = 200. =0.250

= 2386.0 kN

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*1426.\* 950.\*1.4329\*1.e-3

= 2603.9 kN

= min( , )

> = 2288.46 (\* 1.00) kN

4、上侧抗剪计算

= 950. = 200. =0.250

= 2386.0 kN

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*1426.\* 950.\*1.4329\*1.e-3

= 2603.9 kN

= min( , )

> = 2303.26 (\* 1.00) kN

承台阶梯高度：

1阶高： 800mm

2阶高： 200mm

当前荷载组合

| 【74】SATWE基本组合:1.20\*恒+1.40\*风y+0.98\*活 |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=4585.2kN =-38.6kN.m =-0.1kN.m =-0.0kN =5.3kN

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 | 0.0 | -750.0 | 2266.87 | 2331.67 |
| 2 | 0.0 | 750.0 | 2318.35 | 2383.15 |

桩总反力= 4714.8 kN; 桩均反力= 2357.4 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

2、右侧抗剪计算

3、下侧抗剪计算

= 950. = 150. =0.250

= 2386.0 kN

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*1426.\* 950.\*1.4329\*1.e-3

= 2603.9 kN

= min( , )

> = 2266.87 (\* 1.00) kN

4、上侧抗剪计算

= 950. = 150. =0.250

= 2386.0 kN

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*1426.\* 950.\*1.4329\*1.e-3

= 2603.9 kN

= min( , )

> = 2318.35 (\* 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

= 950. = 200. =0.250

= 2386.0 kN

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*1426.\* 950.\*1.4329\*1.e-3

= 2603.9 kN

= min( , )

> = 2266.87 (\* 1.00) kN

4、上侧抗剪计算

= 950. = 200. =0.250

= 2386.0 kN

= [1.75/(+1.0)]

=0.958\*[1.75/(0.250+1.0)]\*1426.\* 950.\*1.4329\*1.e-3

= 2603.9 kN

= min( , )

> = 2318.35 (\* 1.00) kN

承台阶梯高度：

1阶高： 800mm

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：

= 906.75\*1.00= 906.75 Y = -350. H = 950.

= /(0.9\*\*)/XS = 906.75/(0.9\* 950.0\*360.0)/1.5= 1963.9 /m

= 927.34\*1.00= 927.34 Y = 350. H = 950.

= /(0.9\*\*)/XS = 927.34/(0.9\* 950.0\*360.0)/1.5= 2008.5 /m

= 927.34\*1.00= 927.34 Y = 350. H = 950.

= /(0.9\*\*)/XS = 927.34/(0.9\* 950.0\*360.0)/1.5= 2008.5 /m

计算的钢筋面积：

= 0./m = 2009./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 | 1883.94 (18) | 1208.57 (5) | 2108.24 (44) | 1069.36 (45) |
| 2 | 1902.37 (20) | 1128.39 (5) | 2270.26 (44) | 858.69 (45) |

桩平均反力最大值1887.76 (非震)(Load 18)

桩平均反力最小值1168.48 (非震)(Load 5)

桩平均反力最大值2189.25 (震)(Load 44)

桩平均反力最小值964.02 (震)(Load 45)

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800 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1390 /m Load： 54

Y方向：弯矩927.34 kN.m 计算钢筋面积2009 /m Load： 74