桩承台计算\_序号112

# 一、设计资料

1、承台信息

承台底标高：-4.50m

承台高：1750mm

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 | 1155 |
| 2 | -1000 | -577 |
| 3 | 1000 | -577 |

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

= 5.6× 24.0

= 134.4 kN

∑ = 2000000.1 ∑ = 2000000.0

当前荷载组合

| 【11】SATWE标准组合:1.00\*恒-1.00\*风y左 |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=4702.7kN =43.6kN.m =54.4kN.m =142.2kN =-97.1kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | 0.0 | 1154.7 | 1542.40 | 1587.19 | 满足 |
| 2 | -1000.0 | -577.4 | 1552.98 | 1597.77 | 满足 |
| 3 | 1000.0 | -577.3 | 1607.34 | 1652.13 | 满足 |

桩总反力= 4837.1 kN; 桩均反力= 1612.4 kN

当前荷载组合

| 【30】SATWE标准组合:1.00\*恒+1.00\*活+0.60\*风y左 |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=6230.5kN =22.7kN.m =40.6kN.m =143.3kN =-94.7kN

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 | 1154.7 | 2063.74 | 2108.52 | 满足 |
| 2 | -1000.0 | -577.4 | 2063.08 | 2107.86 | 满足 |
| 3 | 1000.0 | -577.3 | 2103.71 | 2148.50 | 满足 |

桩总反力= 6364.9 kN; 桩均反力= 2121.6 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=4400.8kN =19.7kN.m =144.2kN.m =218.7kN =-83.1kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | 0.0 | 1154.7 | 1455.54 | 1500.32 | 满足 |
| 2 | -1000.0 | -577.4 | 1400.52 | 1445.31 | 满足 |
| 3 | 1000.0 | -577.3 | 1544.71 | 1589.50 | 满足 |

桩总反力= 4535.1 kN; 桩均反力= 1511.7 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=6654.0kN =40.5kN.m =-53.8kN.m =63.1kN =-105.1kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | 0.0 | 1154.7 | 2194.65 | 2239.44 | 满足 |
| 2 | -1000.0 | -577.4 | 2256.61 | 2301.39 | 满足 |
| 3 | 1000.0 | -577.3 | 2202.78 | 2247.57 | 满足 |

桩总反力= 6788.4 kN; 桩均反力= 2262.8 kN

当前荷载组合

| 【48】SATWE标准组合:1.00\*恒+0.50\*活+0.20\*风x右+1.00\*地x |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=4398.8kN =21.8kN.m =142.7kN.m =217.7kN =-84.5kN

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) | 是否满足 |
| --- | --- | --- | --- | --- | --- |
| 1 | 0.0 | 1154.7 | 1453.70 | 1498.48 | 满足 |
| 2 | -1000.0 | -577.4 | 1401.18 | 1445.96 | 满足 |
| 3 | 1000.0 | -577.3 | 1543.92 | 1588.71 | 满足 |

桩总反力= 4533.2 kN; 桩均反力= 1511.1 kN

当前荷载组合

| 【49】SATWE标准组合:1.00\*恒+0.50\*活-0.20\*风x右-1.00\*地x |
| --- |

承台底面荷载 :（考虑柱底剪力的影响）

N=6656.0kN =38.4kN.m =-52.4kN.m =64.2kN =-103.7kN

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 | 1154.7 | 2196.49 | 2241.28 | 满足 |
| 2 | -1000.0 | -577.4 | 2255.95 | 2300.74 | 满足 |
| 3 | 1000.0 | -577.3 | 2203.57 | 2248.36 | 满足 |

桩总反力= 6790.4 kN; 桩均反力= 2263.5 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=7466.1kN =39.0kN.m =58.1kN.m =181.5kN =-122.9kN

承台及覆土重:

= 134.4×1.20= 161.2

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) |
| --- | --- | --- | --- | --- |
| 1 | 0.0 | 1154.7 | 2466.22 | 2519.96 |
| 2 | -1000.0 | -577.4 | 2470.94 | 2524.68 |
| 3 | 1000.0 | -577.3 | 2529.00 | 2582.74 |

桩总反力= 7627.4 kN; 桩均反力= 2542.5 kN

a、角桩冲切

= 1700. = 450. =0.26 = 1066. =1.21

= 1700. = 524. =0.31 = 1039. =1.10

下部：

= (2+)tan(/2)

= 1.21×(2× 1066.+ 450.)×tan(1.05/2)×0.9208\* 1.433× 1700.×1e-3

= 4029.30 kN

> = 2529.00×1.00 kN

上部：

= (2+)×tan(/2)

= 1.10×(2× 1066.+ 524.)×tan(1.05/2)×0.9208\* 1.433× 1700.×1e-3

= 3714.23 kN

> = 2529.00×1.00 kN

b、抗剪切计算

承台高度 HCD= 1750.

左侧：

= 1700. = 450. =0.26

= \*1.75/(λ+1.0)\*\*\*\*1.E-3

= 0.83\*1.75/(0.26+1.0)\* 2236.\* 1700.\*1.4329\*1.e-3

= 6242.41

> = 2529.00 (\* 1.00) kN

承台高度 HCD= 1750.00

上侧：

= 1700. = 605. =0.36

= \*1.75/(λ+1.0)\*\*\*\*1.E-3

= 0.83\*1.75/(0.36+1.0)\* 1735.\* 1700.\*1.4329\*1.e-3

= 4517.73

> = 2529.00 (\* 1.00) kN

承台高度 HCD= 1750.00

下侧：

= 1700. = 27. =0.25

= \*1.75/(+1.0)\*\*\*\*1.E-3

= 0.92\*1.75/(0.25+1.0)\* 2908.\* 1700.\*1.4329\*1.e-3

= 8213.76

> = 2529.00 (\* 1.00) kN

承台阶梯高度：

1阶高： 1750mm

c、承台板配筋计算

=2529.00 = 2000. c = 700.

M = (-0.433\*c)/3 = 1430.48 kN.m

= 2597.10

= 727.

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=7779.7kN =41.7kN.m =62.5kN.m =195.0kN =-130.8kN

承台及覆土重:

= 134.4×1.35= 181.4

桩反力表

| 桩号 | X | Y | 桩净反力Qn(kN) | 桩反力Q(kN) |
| --- | --- | --- | --- | --- |
| 1 | 0.0 | 1154.7 | 2569.14 | 2629.60 |
| 2 | -1000.0 | -577.4 | 2574.04 | 2634.50 |
| 3 | 1000.0 | -577.3 | 2636.50 | 2696.96 |

桩总反力= 7961.1 kN; 桩均反力= 2653.7 kN

a、角桩冲切

= 1700. = 450. =0.26 = 1066. =1.21

= 1700. = 524. =0.31 = 1039. =1.10

下部：

= (2+)tan(/2)

= 1.21×(2× 1066.+ 450.)×tan(1.05/2)×0.9208\* 1.433× 1700.×1e-3

= 4029.30 kN

> = 2636.50×1.00 kN

上部：

= (2+)×tan(/2)

= 1.10×(2× 1066.+ 524.)×tan(1.05/2)×0.9208\* 1.433× 1700.×1e-3

= 3714.23 kN

> = 2636.50×1.00 kN

b、抗剪切计算

承台高度 HCD= 1750.

左侧：

= 1700. = 450. =0.26

= \*1.75/(λ+1.0)\*\*\*\*1.E-3

= 0.83\*1.75/(0.26+1.0)\* 2236.\* 1700.\*1.4329\*1.e-3

= 6242.41

> = 2636.50 (\* 1.00) kN

承台高度 HCD= 1750.00

上侧：

= 1700. = 605. =0.36

= \*1.75/(λ+1.0)\*\*\*\*1.E-3

= 0.83\*1.75/(0.36+1.0)\* 1735.\* 1700.\*1.4329\*1.e-3

= 4517.73

> = 2636.50 (\* 1.00) kN

承台高度 HCD= 1750.00

下侧：

= 1700. = 27. =0.25

= \*1.75/(+1.0)\*\*\*\*1.E-3

= 0.92\*1.75/(0.25+1.0)\* 2908.\* 1700.\*1.4329\*1.e-3

= 8213.76

> = 2636.50 (\* 1.00) kN

承台阶梯高度：

1阶高： 1750mm

c、承台板配筋计算

=2636.50 = 2000. c = 700.

M = (-0.433\*c)/3 = 1491.29 kN.m

= 2707.50

= 727.

# 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 | 2108.52 (30) | 1587.19 (11) | 2241.28 (49) | 1498.48 (48) |
| 2 | 2107.86 (30) | 1597.77 (11) | 2301.39 (43) | 1445.31 (42) |
| 3 | 2148.50 (30) | 1652.13 (11) | 2248.36 (49) | 1588.71 (48) |

桩平均反力最大值2121.63 (非震)(Load 30)

桩平均反力最小值1612.36 (非震)(Load 11)

桩平均反力最大值2263.46 (震)(Load 49)

桩平均反力最小值1511.05 (震)(Load 48)

基本组合下承台冲切、剪切、配筋计算:

角桩冲切计算：

桩 1: 抗力4029.30 kN 冲切力2636.50 kN ：1700 mm (Load:55)

桩 2: 抗力3714.23 kN 冲切力2636.50 kN ：1700 mm (Load:55)

抗剪计算：

1左边： 抗力6242.41kN 剪力2636.50kN ：1700mm (Load:55)

2上边： 抗力4517.73kN 剪力2636.50kN ：1700mm (Load:55)

承台高度：

承台高1750

底板配筋计算：

弯矩1491.29 kN.m 计算钢筋面积2708 Load： 55

配筋宽度727 mm

每边受弯筋 AS= 2708. 钢筋级别: HRB400