盈建科软件

目录

[第1章 整体指标统计 1](#_Toc160030002)

[1.1 周期比 1](#_Toc160030003)

[1.2 层刚度统计(各层刚心、偏心率、相邻层侧移刚度比等计算信息) 1](#_Toc160030004)

[1.3 结构整体稳定验算 1](#_Toc160030005)

[1.4 结构整体抗倾覆验算 1](#_Toc160030006)

[1.5 楼层抗剪承载力验算 1](#_Toc160030007)

第1章 整体指标统计

1.1 周期比

第1扭转周期(1.0884)/第1平动周期(1.5431) = 0.71

1.2 层刚度统计(各层刚心、偏心率、相邻层侧移刚度比等计算信息)

Xstif,Ystif(m): 刚心的 X，Y 坐标值

Alf(Degree): 层刚性主轴的方向

Xmass,Ymass(m): 质心的 X，Y 坐标值

Gmass(t): 总质量

Eex,Eey: X，Y 方向的偏心率

| **层号** | **塔号** | **Xstif,Ystif** | **Alf** | **Xmass,Ymass** | **Gmass** | **Eex,Eey** |
| --- | --- | --- | --- | --- | --- | --- |
| 21 | 1 | 135.68,95.60 | 179.98 | 135.71,91.97 | 393.79 | 18.76%,0.30% |
| 20 | 1 | 135.70,92.70 | 45.00 | 135.68,90.84 | 906.13 | 8.69%,0.10% |
| 19 | 1 | 135.69,92.74 | 45.00 | 135.69,91.15 | 705.21 | 7.37%,0.02% |
| 18 | 1 | 135.69,92.74 | 45.00 | 135.69,91.16 | 727.48 | 7.34%,0.02% |
| 17 | 1 | 135.69,92.74 | 45.00 | 135.69,91.16 | 727.48 | 7.34%,0.02% |
| 16 | 1 | 135.69,92.74 | 45.00 | 135.69,91.16 | 727.48 | 7.34%,0.02% |
| 15 | 1 | 135.69,92.76 | 45.00 | 135.69,91.68 | 771.90 | 5.04%,0.02% |
| 14 | 1 | 135.69,92.74 | 45.00 | 135.69,91.16 | 727.48 | 7.34%,0.02% |
| 13 | 1 | 135.69,92.74 | 45.00 | 135.69,91.16 | 727.48 | 7.34%,0.02% |
| 12 | 1 | 135.69,92.74 | 45.00 | 135.69,91.16 | 727.48 | 7.34%,0.02% |
| 11 | 1 | 135.69,92.74 | 45.00 | 135.69,91.16 | 727.48 | 7.34%,0.02% |
| 10 | 1 | 135.69,92.74 | 45.00 | 135.69,91.16 | 727.48 | 7.34%,0.02% |
| 9 | 1 | 135.69,92.74 | 45.00 | 135.69,91.16 | 727.48 | 7.34%,0.02% |
| 8 | 1 | 135.69,92.74 | 45.00 | 135.69,91.16 | 727.48 | 7.34%,0.02% |
| 7 | 1 | 135.69,92.74 | 45.00 | 135.69,91.16 | 727.48 | 7.34%,0.02% |
| 6 | 1 | 135.69,92.75 | 45.00 | 135.69,91.19 | 697.88 | 7.24%,0.02% |
| 5 | 1 | 135.69,92.75 | 45.00 | 135.68,91.16 | 748.19 | 7.39%,0.09% |
| 4 | 1 | 135.69,92.84 | 45.00 | 135.68,91.53 | 766.96 | 6.12%,0.09% |
| 3 | 1 | 135.69,92.85 | 45.00 | 135.68,92.13 | 798.95 | 3.50%,0.10% |
| 2 | 1 | 135.68,91.75 | 45.00 | 135.74,91.76 | 1212.67 | 0.02%,0.36% |
| 1 | 1 | 134.53,91.04 | 45.00 | 129.88,92.14 | 9212.24 | 6.49%,23.67% |

**《高规》3.5.2-1条规定：对框架结构,楼层与其相邻上层的侧向刚度比，本层与相邻上层的比值不宜小于0.7，与相邻上部三层刚度平均值的比值不宜小于0.8。**

**《高规》3.5.2-2条规定：对框架-剪力墙、板柱-剪力墙结构、剪力墙结构、框架-核心筒结构、筒中筒结构，楼层与其相邻上层的侧向刚度比γ2可按式（3.5.2-2）计算，且本层与相邻上层的比值不宜小于0.9；当本层层高大于相邻上层层高的1.5倍时，该比值不宜小于1.1；对结构底部嵌固层，该比值不宜小于1.5。**

Ratx,Raty: X，Y 方向本层塔侧移刚度与下一层相应塔侧移刚度的比值(剪切刚度)

Ratx1,Raty1: X，Y 方向本层塔侧移刚度与上一层相应塔侧移刚度70%的比值或上三层平均侧移刚度80%的比值中之较小者

Ratx2,Raty2: X，Y 方向本层塔侧移刚度与上一层相应塔侧移刚度90%、110%或者150%比值。110%指当本层层高大于相邻上层层高1.5倍时，150%指嵌固层

RJX1,RJY1,RJZ1: 结构总体坐标系中塔的侧移刚度和扭转刚度(剪切刚度)

RJX3,RJY3,RJZ3: 结构总体坐标系中塔的侧移刚度和扭转刚度(地震剪力与地震层间位移的比)

Rs: 薄弱层地震剪力放大系数

| **层号** | **塔号** | **Ratx,Raty** | **Ratx1,Raty1** | **Ratx2,Raty2** | **RJX1,RJY1**  **(kN/m)** | **RJX3,RJY3**  **(kN/m)** | **Rs** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 21 | 1 | 0.34,0.48 | 1.00,1.00 | 1.00,1.00 | 1.22E+007  2.97E+007 | 3.58E+005  2.25E+005 | 1.00 |
| 20 | 1 | 0.96,0.96 | 3.34,4.33 | 2.23,2.90 | 3.59E+007  6.24E+007 | 8.36E+005  6.81E+005 | 1.00 |
| 19 | 1 | 1.00,1.00 | 1.84,1.94 | 1.38,1.46 | 3.73E+007  6.47E+007 | 1.08E+006  9.27E+005 | 1.00 |
| 18 | 1 | 1.00,1.00 | 1.62,1.67 | 1.26,1.30 | 3.73E+007  6.47E+007 | 1.22E+006  1.08E+006 | 1.00 |
| 17 | 1 | 1.00,1.00 | 1.53,1.58 | 1.19,1.23 | 3.73E+007  6.47E+007 | 1.31E+006  1.20E+006 | 1.00 |
| 16 | 1 | 1.00,1.00 | 1.42,1.52 | 1.16,1.21 | 3.73E+007  6.47E+007 | 1.37E+006  1.30E+006 | 1.00 |
| 15 | 1 | 1.00,1.00 | 1.37,1.48 | 1.16,1.20 | 3.73E+007  6.47E+007 | 1.42E+006  1.41E+006 | 1.00 |
| 14 | 1 | 1.00,1.00 | 1.33,1.45 | 1.13,1.19 | 3.73E+007  6.47E+007 | 1.45E+006  1.51E+006 | 1.00 |
| 13 | 1 | 1.00,1.00 | 1.31,1.43 | 1.14,1.18 | 3.73E+007  6.47E+007 | 1.48E+006  1.61E+006 | 1.00 |
| 12 | 1 | 1.00,1.00 | 1.31,1.42 | 1.14,1.19 | 3.73E+007  6.47E+007 | 1.52E+006  1.72E+006 | 1.00 |
| 11 | 1 | 1.00,1.00 | 1.33,1.43 | 1.15,1.20 | 3.73E+007  6.47E+007 | 1.58E+006  1.85E+006 | 1.00 |
| 10 | 1 | 1.00,1.00 | 1.34,1.47 | 1.16,1.22 | 3.73E+007  6.47E+007 | 1.64E+006  2.02E+006 | 1.00 |
| 9 | 1 | 1.00,1.00 | 1.36,1.51 | 1.17,1.23 | 3.73E+007  6.47E+007 | 1.72E+006  2.25E+006 | 1.00 |
| 8 | 1 | 1.00,1.00 | 1.40,1.55 | 1.19,1.25 | 3.73E+007  6.47E+007 | 1.84E+006  2.53E+006 | 1.00 |
| 7 | 1 | 0.95,0.95 | 1.44,1.59 | 1.21,1.27 | 3.73E+007  6.47E+007 | 2.00E+006  2.89E+006 | 1.00 |
| 6 | 1 | 0.90,0.92 | 1.51,1.66 | 1.25,1.31 | 3.92E+007  6.81E+007 | 2.24E+006  3.40E+006 | 1.00 |
| 5 | 1 | 0.96,0.98 | 1.62,1.76 | 1.30,1.37 | 4.35E+007  7.42E+007 | 2.63E+006  4.18E+006 | 1.00 |
| 4 | 1 | 1.00,1.01 | 1.78,1.86 | 1.38,1.45 | 4.52E+007  7.54E+007 | 3.27E+006  5.44E+006 | 1.00 |
| 3 | 1 | 0.39,0.70 | 2.16,2.13 | 1.68,1.66 | 4.52E+007  7.45E+007 | 4.95E+006  8.12E+006 | 1.00 |
| 2 | 1 | 0.93,1.01 | 9.65,3.92 | 8.17,3.32 | 1.16E+008  1.06E+008 | 3.34E+007  2.23E+007 | 1.00 |
| 1 | 1 | 1.00,1.00 | 3.53,3.61 | 1.53,1.56 | 1.25E+008  1.05E+008 | 8.26E+007  5.63E+007 | 1.00 |

X方向最小刚度比: 1.0000(21 层 1 塔)

Y方向最小刚度比: 1.0000(21 层 1 塔)

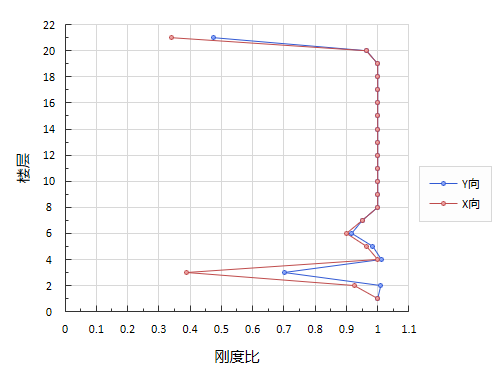


图1-1 多方向刚度比简图(塔 1)

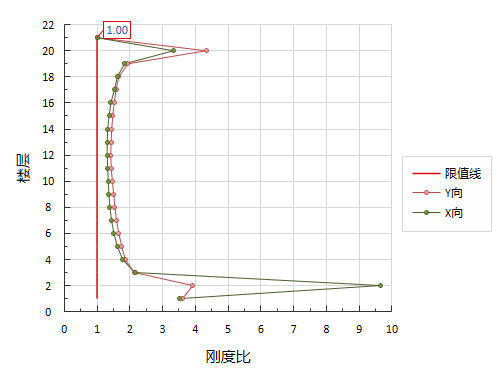


图1-2 多方向刚度比1简图(塔 1)

1.3 结构整体稳定验算

刚度单位： kN/m

层高单位： m

上部重量单位： kN

表1-1 地震

| **层号** | **塔号** | **X向刚重比EJd/GH\*\*2** | **Y向刚重比EJd/GH\*\*2** |
| --- | --- | --- | --- |
| 3 | 1 | 8.003 | 8.650 |

该结构刚重比EJd/GH\*\*2大于1.4，能够通过《高规》5.4.4条的整体稳定验算

该结构刚重比EJd/GH\*\*2大于2.7，满足《高规》5.4.1，可以不考虑重力二阶效应

表1-2 风荷载

| **层号** | **塔号** | **X向刚重比EJd/GH\*\*2** | **Y向刚重比EJd/GH\*\*2** |
| --- | --- | --- | --- |
| 3 | 1 | 9.586 | 8.453 |

该结构刚重比EJd/GH\*\*2大于1.4，能够通过《高规》5.4.4条的整体稳定验算

该结构刚重比EJd/GH\*\*2大于2.7，满足《高规》5.4.1，可以不考虑重力二阶效应

1.4 结构整体抗倾覆验算

**根据《高规》12.1.7条，在重力荷载与水平荷载标准值或重力荷载代表值与多遇水平地震标准值共同作用下，高宽比大于4的高层建筑，基础底面不宜出现零应力区；高宽比不大于4的高层建筑，基础底面与地基之间零应力区面积不应超过基础底面面积的15％。结构的抗倾覆验算结果如下：**

表1-3 结构整体抗倾覆验算(单位：kN.m)

| **层号** | **塔号** | **工况** | **抗倾覆力矩Mr** | **倾覆力矩Mov** | **比值Mr/Mov** | **零应力区(%)** |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | X向风 | 0.000E+000 | 0.000E+000 | -1.#J | 0.00 |
| Y向风 | 0.000E+000 | 0.000E+000 | -1.#J | 0.00 |
| X地震 | 0.000E+000 | 0.000E+000 | -1.#J | 0.00 |
| Y地震 | 0.000E+000 | 0.000E+000 | -1.#J | 0.00 |

1.5 楼层抗剪承载力验算

**《高规》3.5.3条规定：A级高度高层建筑的楼层抗侧力结构的层间受剪承载力不宜小于其相邻上一层受剪承载力的80%，不应小于其相邻上一层受剪承载力的65%；B级高度高层建筑的楼层抗侧力结构的层间受剪承载力不应小于其相邻上一层受剪承载力的75%。**

**结构设定的限值是80.00%。并无楼层承载力突变的情况。**

Ratio\_X,Ratio\_Y: 表示本层与上一层的承载力之比

表1-4 楼层抗剪承载力验算(单位：kN)

| **层号** | **塔号** | **X向承载力** | **Y向承载力** | **Ratio\_X** | **Ratio\_Y** |
| --- | --- | --- | --- | --- | --- |
| 21 | 1 | 3.8063E+003 | 9.5882E+003 | 1.00 | 1.00 |
| 20 | 1 | 1.0180E+004 | 1.8561E+004 | 2.67 | 1.94 |
| 19 | 1 | 1.0343E+004 | 1.8538E+004 | 1.02 | 1.00 |
| 18 | 1 | 1.0560E+004 | 1.9102E+004 | 1.02 | 1.03 |
| 17 | 1 | 1.0763E+004 | 1.9420E+004 | 1.02 | 1.02 |
| 16 | 1 | 1.0920E+004 | 1.9726E+004 | 1.01 | 1.02 |
| 15 | 1 | 1.1159E+004 | 2.0269E+004 | 1.02 | 1.03 |
| 14 | 1 | 1.1333E+004 | 2.0579E+004 | 1.02 | 1.02 |
| 13 | 1 | 1.1516E+004 | 2.0908E+004 | 1.02 | 1.02 |
| 12 | 1 | 1.1687E+004 | 2.1220E+004 | 1.01 | 1.01 |
| 11 | 1 | 1.1848E+004 | 2.1478E+004 | 1.01 | 1.01 |
| 10 | 1 | 1.2006E+004 | 2.1760E+004 | 1.01 | 1.01 |
| 9 | 1 | 1.2127E+004 | 2.1938E+004 | 1.01 | 1.01 |
| 8 | 1 | 1.2226E+004 | 2.2069E+004 | 1.01 | 1.01 |
| 7 | 1 | 1.2323E+004 | 2.2191E+004 | 1.01 | 1.01 |
| 6 | 1 | 1.3313E+004 | 2.3476E+004 | 1.08 | 1.06 |
| 5 | 1 | 1.5083E+004 | 2.5540E+004 | 1.13 | 1.09 |
| 4 | 1 | 1.5798E+004 | 2.5648E+004 | 1.05 | 1.00 |
| 3 | 1 | 1.6094E+004 | 2.6601E+004 | 1.02 | 1.04 |
| 2 | 1 | 4.4113E+004 | 3.9788E+004 | 2.74 | 1.50 |
| 1 | 1 | 6.2061E+004 | 6.0112E+004 | 1.41 | 1.51 |

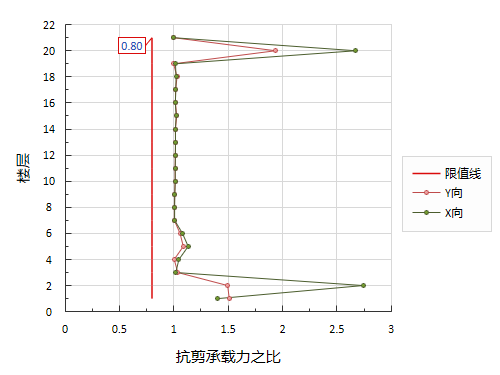


图1-3 多方向抗剪承载力比简图(塔 1)