罩棚一结构计算书

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1. 设计依据

《钢结构设计标准》 (GB50017-2017)

《冷弯薄壁型钢结构技术规范》 (GB50018-2002)

《建筑结构荷载规范》 (GB50009-2012)

《建筑抗震设计规范》 (GB50011-2010)(2016年版)

《建筑地基基础设计规范》 (GB50007-2011)

《建筑结构可靠性设计统一标准》 (GB50068-2018)

《钢管混凝土结构技术规范》 (GB50936-2014)

《钢管混凝土结构设计规程》 (CECS 28:2012)

《矩形钢管混凝土结构技术规程》 (CECS159-2004)

《钢结构焊接规范》 (GB50661-2011)

《钢结构高强度螺栓连接技术规程》 (JGJ82-2011)

1. 软件信息

3D3S Design 2021.1.0（上海同磊土木工程技术有限公司）

1. 结构信息
   1. 总体信息

节点总数　　　　91

支座总数　　　　11

单元总数　　　　188

材料种类　　　　2

截面种类　　　　9

荷载工况　　　　4

* 1. 截面信息



截面编号图（整体）

|  |  |  |  |
| --- | --- | --- | --- |
| 截面信息表 | | | |
| 截面编号 | 截面类型 | 截面名称 | 构件总数 |
| 1 | 焊接对称工字型截面 | H400x400x12x20 | 8 |
| 2 | 焊接对称工字型截面 | H600x290x10x16 | 36 |
| 3 | 焊接对称工字型截面 | H500x200x8x14 | 16 |
| 4 | 焊接对称工字型截面 | H400x200x8x12 | 19 |
| 5 | 焊接对称工字型截面 | H300x180x6x10 | 23 |
| 6 | 方形空心型钢 | 方200x8.0 | 26 |
| 7 | 方形空心型钢 | 方80x3.0 | 4 |
| 8 | 矩形空心型钢 | 矩140x80x4.0 | 12 |
| 9 | 圆形截面 | φ22 | 44 |

* 1. 计算参数

(1)动力特性计算

计算振型数: 9

振型类型: 特征向量

(2)线性计算

梁单元属性: 一般梁单元（欧拉梁）

梁抗扭惯性矩: 自由扭转惯性矩

考虑P - Δ / 二阶效应：否

* 1. 设计参数

结构重要性系数：1.000

支撑临界角：15.000°

|  |  |  |
| --- | --- | --- |
| 抗震等级 | | |
| 结构类型 | 抗震等级 | 构造措施的抗震等级 |
| 钢框架 | 三级 | 三级 |

1. 计算简图



计算简图（整体）

注：蓝色单元为普通单元，绿色单元为连接单元，绿色实心圆为支座，黄色实心圆为主从节点的主节点

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 支座信息表（单位: 刚度：kN/mm kN\*mm/rad 位移：mm rad） | | | | | | |
| 支座类型 | 平动1 | 平动2 | 平动3 | 转动R1 | 转动R2 | 转动R3 |
| 1 | 刚性 | 刚性 | 刚性 | 刚性 | 刚性 | 刚性 |
| 2 | 无 | 刚性 | 刚性 | 无 | 无 | 无 |

1. 材料信息
   1. 材料特性

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 名称 | 材料 | 弹性模量(kN/mm2) | 泊松比 | 线膨胀系数 | 设计强度(MPa) | 质量密度(kg/mm3) |
| Q355B-1 | Q355 | 206.000 | 0.300 | 1.20e-005 | 按规范 | 7.85e-006 |
| Q235B-1 | Q235 | 206.000 | 0.300 | 1.20e-005 | 按规范 | 7.85e-006 |

* 1. 材料统计

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 钢汇总表 | | | | | |
| 序号 | 截面 | 材性 | 数量 | 长度(m) | 重量(kg) |
| 1 | 方80x3.0 | Q355B-1 | 4 | 4.445 | 31.435 |
| 2 | 方200x8.0 | Q355B-1 | 26 | 35.036 | 1628.209 |
| 3 | 矩140x80x4.0 | Q355B-1 | 12 | 25.800 | 335.126 |
| 4 | H300x180x6x10 | Q355B-1 | 23 | 132.000 | 5471.136 |
| 5 | H400x200x8x12 | Q355B-1 | 19 | 100.000 | 6129.280 |
| 6 | H500x200x8x14 | Q355B-1 | 16 | 92.000 | 6771.347 |
| 7 | H600x290x10x16 | Q355B-1 | 36 | 204.000 | 23956.944 |
| 8 | H400x400x12x20 | Q355B-1 | 8 | 68.000 | 10846.816 |
| 9 | φ22 | Q235B-1 | 44 | 337.738 | 1007.823 |
|  |  |  | 188 根 | 999.019 m | 56178 kg |

1. 荷载与组合
   1. 工况信息

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 序号 | 工况号 | 荷载类型 | 自重系数 | 荷载说明 |
| 1 | 0 | 恒 | 1 |  |
| 2 | 1 | 活 | 0 |  |
| 3 | 2 | 风 | 0 |  |
| 4 | 3 | 风 | 0 |  |

* 1. 荷载信息

(1)单元荷载列表(力：kN；分布力：kN/m；弯矩：kN.m；分布弯矩：kN.m/m)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 序号 | 荷载类型 | 工况 | 类型 | 方向 | 数值 | Q1 | Q2 | X1 | X2 |
| 1 | 恒 | 0 | 1 | Z | 绝对 | -0.500 | -0.500 | 0.000 | 0.000 |
| 2 | 活 | 1 | 1 | Z | 绝对 | -0.500 | -0.500 | 0.000 | 0.000 |

(2)杆件导荷载列表(力：kN；分布力：kN/m；弯矩：kN.m；分布弯矩：kN.m/m)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 序号 | 荷载类型 | 工况 | 导荷方式 | 体型系数 | 面荷载值(基本风压) |
| 1 | 恒 | 0 | 单向杆件 | -- | 0.200 |
| 2 | 恒 | 0 | 单向杆件 | -- | 0.300 |
| 3 | 活 | 1 | 单向杆件 | -- | 0.500 |
| 4 | 风 | 2 | 单向杆件 | 1.300 | 0.450 |
| 5 | 风 | 3 | 单向杆件 | -2.000 | 0.450 |

* + 1. **恒荷载**
       1. 恒荷载0

(1)恒荷载0单元荷载

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 单元荷载表 | | | | | | |
| 序号 | 类型 | 方向 | Q1 | Q2 | X1(mm) | X2(mm) |
| 1 | 均布荷载 | Z | -0.500 | -0.500 | 0.000 | 0.000 |





恒荷载工况0单元荷载分布图（整体）

(2)恒荷载0杆件导荷载

|  |  |  |  |
| --- | --- | --- | --- |
| 杆件荷载表 | | | |
| 序号 | 导荷方式 | 面荷载值kN/m2 | 不均匀分布 |
| 1 | 单向杆件 | 0.300 | 否 |
| 2 | 单向杆件 | 0.200 | 否 |





恒荷载工况0杆件导荷载分布图（整体）

* + 1. **活荷载**
       1. 活荷载1

(1)活荷载1单元荷载

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 单元荷载表 | | | | | | |
| 序号 | 类型 | 方向 | Q1 | Q2 | X1(mm) | X2(mm) |
| 1 | 均布荷载 | Z | -0.500 | -0.500 | 0.000 | 0.000 |





活荷载工况1单元荷载分布图（整体）

(2)活荷载1杆件导荷载

|  |  |  |  |
| --- | --- | --- | --- |
| 杆件荷载表 | | | |
| 序号 | 导荷方式 | 面荷载值kN/m2 | 不均匀分布 |
| 1 | 单向杆件 | 0.500 | 否 |





活荷载工况1杆件导荷载分布图（整体）

* + 1. **风荷载**
       1. 基本参数

基本风压：0.45(kN/m2)

地面粗糙度：B

风计算用规范：《建筑结构荷载规范》(GB50009-2012)

风荷载计算用阻尼比：0.01

参考点高度Z0（m）：-8.50

风压高度变化修正系数：1.00

* + - 1. 风荷载2

(1)风荷载2杆件导荷载

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 杆件荷载表 | | | | |
| 序号 | 导荷方式 | 基本风压(kN/m2) | 体型系数 | 风振系数 |
| 1 | 单向杆件 | 0.450 | 1.300 | 自动计算 |





风荷载工况2体型系数分布图（整体）

* + - 1. 风荷载3

(1)风荷载3杆件导荷载

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 杆件荷载表 | | | | |
| 序号 | 导荷方式 | 基本风压(kN/m2) | 体型系数 | 风振系数 |
| 1 | 单向杆件 | 0.450 | -2.000 | 自动计算 |





风荷载工况3体型系数分布图（整体）

* + 1. **地震作用**

计算依据：GB50011

地震烈度：6度0.05g

场地类别：Ⅱ类

设计地震分组：第一组

特征周期值(s)：0.35

多遇水平地震影响系数最大值：0.04

罕遇水平地震影响系数最大值：0.28

计算振型数：9

结构阻尼比：0.04

周期折减系数：1

按双向地震作用考虑耦合：否

振型组合方法：CQC

计算竖向地震作用：否

* + 1. **雪荷载**
    2. **温度荷载**
    3. **吊车荷载**
    4. **积灰荷载**
    5. **裹冰荷载**
  1. 荷载组合

(1) 1.300 恒载 + 1.50活载1

(2) 1.300 恒载 + 1.50风载2

(3) 1.300 恒载 + 1.50风载3

(4) 1.300 恒载 + 1.50活载1 + 1.50 x 0.60风载2

(5) 1.300 恒载 + 1.50活载1 + 1.50 x 0.60风载3

(6) 1.300 恒载 + 1.50 x 0.70活载1 + 1.50风载2

(7) 1.300 恒载 + 1.50 x 0.70活载1 + 1.50风载3

(8) 1.300 恒载 + 1.50 x 0.70活载1 + 1.50 x 0.60风载2

(9) 1.300 恒载 + 1.50 x 0.70活载1 + 1.50 x 0.60风载3

(10) 1.300 恒载 + 1.30 x 0.50活载1 + 1.400 水平地震

(11) 1.000 恒载 + 1.50风载2

(12) 1.000 恒载 + 1.50风载3

(13) 1.000 恒载 + 1.00 x 0.50活载1 + 1.400 水平地震

(14) 1.350 恒载 + 1.40 x 0.70活载1 + 1.40 x 0.60风载2

(15) 1.350 恒载 + 1.40 x 0.70活载1 + 1.40 x 0.60风载3

(16) 1.350 恒载 + 1.40 x 0.70活载1

(17) 1.350 恒载 + 1.40 x 0.60风载2

(18) 1.350 恒载 + 1.40 x 0.60风载3

1. 周期与振型
   1. 周期与质量参与系数

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 振型 | 周期(s) | X向质量参与系数 | Y向质量参与系数 | Z向质量参与系数 |
| 1 | 0.954 | 99.496% | 0.000% | 0.001% |
| 2 | 0.688 | 0.061% | 31.003% | 0.000% |
| 3 | 0.597 | 0.031% | 63.488% | 0.000% |
| 4 | 0.485 | 0.015% | 0.000% | 0.014% |
| 5 | 0.460 | 0.004% | 0.115% | 0.005% |
| 6 | 0.439 | 0.006% | 0.588% | 0.001% |
| 7 | 0.405 | 0.001% | 0.011% | 0.004% |
| 8 | 0.378 | 0.008% | 0.023% | 0.225% |
| 9 | 0.354 | 0.000% | 0.001% | 1.481% |
| 合计 |  | 99.622% | 95.230% | 1.731% |

* 1. 振型图

1. 线性稳定计算
   1. 线性稳定系数表
   2. 模态图
2. 线性计算结果
   1. 线性反力
      1. **最不利反力**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 线性组合最不利反力表(标准值)(单位：kN、kN.m) | | | | | | | | | |
| 节点号 | 控制 | 组合号 | 组合序号 | N1 | N2 | N3 | M1 | M2 | M3 |
| 22 | N1最大 | 1 | 1 | 0.000 | -0.417 | 6.347 | 0.000 | 0.000 | 0.000 |
| 22 | N2最大 | 10 | 4 | 0.000 | 0.866 | 4.402 | 0.000 | 0.000 | 0.000 |
| 22 | N3最大 | 6 | 1 | 0.000 | -0.708 | 11.779 | 0.000 | 0.000 | 0.000 |
| 22 | M1最大 | 1 | 1 | 0.000 | -0.417 | 6.347 | 0.000 | 0.000 | 0.000 |
| 22 | M2最大 | 1 | 1 | 0.000 | -0.417 | 6.347 | 0.000 | 0.000 | 0.000 |
| 22 | M3最大 | 1 | 1 | 0.000 | -0.417 | 6.347 | 0.000 | 0.000 | 0.000 |
| 22 | 合力最大 | 6 | 1 | 0.000 | -0.708 | 11.779 | 0.000 | 0.000 | 0.000 |
| 22 | N1最小 | 1 | 1 | 0.000 | -0.417 | 6.347 | 0.000 | 0.000 | 0.000 |
| 22 | N2最小 | 10 | 3 | 0.000 | -1.569 | 5.719 | 0.000 | 0.000 | 0.000 |
| 22 | N3最小 | 3 | 1 | 0.000 | 0.234 | -5.775 | 0.000 | 0.000 | 0.000 |
| 22 | M1最小 | 1 | 1 | 0.000 | -0.417 | 6.347 | 0.000 | 0.000 | 0.000 |
| 22 | M2最小 | 1 | 1 | 0.000 | -0.417 | 6.347 | 0.000 | 0.000 | 0.000 |
| 22 | M3最小 | 1 | 1 | 0.000 | -0.417 | 6.347 | 0.000 | 0.000 | 0.000 |
| 20 | N1最大 | 1 | 1 | 0.000 | -1.064 | 10.216 | 0.000 | 0.000 | 0.000 |
| 20 | N2最大 | 3 | 1 | 0.000 | 1.063 | -11.450 | 0.000 | 0.000 | 0.000 |
| 20 | N3最大 | 6 | 1 | 0.000 | -1.976 | 20.148 | 0.000 | 0.000 | 0.000 |
| 20 | M1最大 | 1 | 1 | 0.000 | -1.064 | 10.216 | 0.000 | 0.000 | 0.000 |
| 20 | M2最大 | 1 | 1 | 0.000 | -1.064 | 10.216 | 0.000 | 0.000 | 0.000 |
| 20 | M3最大 | 1 | 1 | 0.000 | -1.064 | 10.216 | 0.000 | 0.000 | 0.000 |
| 20 | 合力最大 | 6 | 1 | 0.000 | -1.976 | 20.148 | 0.000 | 0.000 | 0.000 |
| 20 | N1最小 | 1 | 1 | 0.000 | -1.064 | 10.216 | 0.000 | 0.000 | 0.000 |
| 20 | N2最小 | 10 | 3 | 0.000 | -2.591 | 7.820 | 0.000 | 0.000 | 0.000 |
| 20 | N3最小 | 3 | 1 | 0.000 | 1.063 | -11.450 | 0.000 | 0.000 | 0.000 |
| 20 | M1最小 | 1 | 1 | 0.000 | -1.064 | 10.216 | 0.000 | 0.000 | 0.000 |
| 20 | M2最小 | 1 | 1 | 0.000 | -1.064 | 10.216 | 0.000 | 0.000 | 0.000 |
| 20 | M3最小 | 1 | 1 | 0.000 | -1.064 | 10.216 | 0.000 | 0.000 | 0.000 |
| 18 | N1最大 | 1 | 1 | 0.000 | 1.215 | 6.929 | 0.000 | 0.000 | 0.000 |
| 18 | N2最大 | 6 | 1 | 0.000 | 2.208 | 12.669 | 0.000 | 0.000 | 0.000 |
| 18 | N3最大 | 6 | 1 | 0.000 | 2.208 | 12.669 | 0.000 | 0.000 | 0.000 |
| 18 | M1最大 | 1 | 1 | 0.000 | 1.215 | 6.929 | 0.000 | 0.000 | 0.000 |
| 18 | M2最大 | 1 | 1 | 0.000 | 1.215 | 6.929 | 0.000 | 0.000 | 0.000 |
| 18 | M3最大 | 1 | 1 | 0.000 | 1.215 | 6.929 | 0.000 | 0.000 | 0.000 |
| 18 | 合力最大 | 6 | 1 | 0.000 | 2.208 | 12.669 | 0.000 | 0.000 | 0.000 |
| 18 | N1最小 | 1 | 1 | 0.000 | 1.215 | 6.929 | 0.000 | 0.000 | 0.000 |
| 18 | N2最小 | 3 | 1 | 0.000 | -0.885 | -5.703 | 0.000 | 0.000 | 0.000 |
| 18 | N3最小 | 3 | 1 | 0.000 | -0.885 | -5.703 | 0.000 | 0.000 | 0.000 |
| 18 | M1最小 | 1 | 1 | 0.000 | 1.215 | 6.929 | 0.000 | 0.000 | 0.000 |
| 18 | M2最小 | 1 | 1 | 0.000 | 1.215 | 6.929 | 0.000 | 0.000 | 0.000 |
| 18 | M3最小 | 1 | 1 | 0.000 | 1.215 | 6.929 | 0.000 | 0.000 | 0.000 |
| 16 | N1最大 | 3 | 1 | 0.650 | 27.816 | -169.093 | -76.903 | 1.734 | 0.000 |
| 16 | N2最大 | 3 | 1 | 0.650 | 27.816 | -169.093 | -76.903 | 1.734 | 0.000 |
| 16 | N3最大 | 6 | 1 | -4.864 | -36.361 | 393.584 | 100.290 | -13.157 | 0.000 |
| 16 | M1最大 | 6 | 1 | -4.864 | -36.361 | 393.584 | 100.290 | -13.157 | 0.000 |
| 16 | M2最大 | 10 | 2 | -0.168 | -11.793 | 181.187 | 32.762 | 4.314 | 0.001 |
| 16 | M3最大 | 10 | 3 | -3.667 | -14.900 | 180.824 | 48.974 | -11.443 | 0.002 |
| 16 | 合力最大 | 6 | 1 | -4.864 | -36.361 | 393.584 | 100.290 | -13.157 | 0.000 |
| 16 | N1最小 | 10 | 1 | -5.467 | -11.487 | 177.732 | 31.305 | -19.559 | -0.000 |
| 16 | N2最小 | 6 | 1 | -4.864 | -36.361 | 393.584 | 100.290 | -13.157 | 0.000 |
| 16 | N3最小 | 3 | 1 | 0.650 | 27.816 | -169.093 | -76.903 | 1.734 | 0.000 |
| 16 | M1最小 | 3 | 1 | 0.650 | 27.816 | -169.093 | -76.903 | 1.734 | 0.000 |
| 16 | M2最小 | 10 | 1 | -5.467 | -11.487 | 177.732 | 31.305 | -19.559 | -0.000 |
| 16 | M3最小 | 10 | 4 | -1.967 | -8.379 | 178.095 | 15.093 | -3.802 | -0.002 |
| 14 | N1最大 | 3 | 1 | 5.457 | -27.613 | -202.686 | 79.596 | 15.570 | 0.000 |
| 14 | N2最大 | 6 | 1 | -14.268 | 35.061 | 466.541 | -101.343 | -38.827 | 0.000 |
| 14 | N3最大 | 6 | 1 | -14.268 | 35.061 | 466.541 | -101.343 | -38.827 | 0.000 |
| 14 | M1最大 | 3 | 1 | 5.457 | -27.613 | -202.686 | 79.596 | 15.570 | 0.000 |
| 14 | M2最大 | 3 | 1 | 5.457 | -27.613 | -202.686 | 79.596 | 15.570 | 0.000 |
| 14 | M3最大 | 10 | 3 | -6.085 | 7.160 | 210.137 | -13.292 | -15.004 | 0.002 |
| 14 | 合力最大 | 6 | 1 | -14.268 | 35.061 | 466.541 | -101.343 | -38.827 | 0.000 |
| 14 | N1最小 | 6 | 1 | -14.268 | 35.061 | 466.541 | -101.343 | -38.827 | 0.000 |
| 14 | N2最小 | 3 | 1 | 5.457 | -27.613 | -202.686 | 79.596 | 15.570 | 0.000 |
| 14 | N3最小 | 3 | 1 | 5.457 | -27.613 | -202.686 | 79.596 | 15.570 | 0.000 |
| 14 | M1最小 | 6 | 1 | -14.268 | 35.061 | 466.541 | -101.343 | -38.827 | 0.000 |
| 14 | M2最小 | 6 | 1 | -14.268 | 35.061 | 466.541 | -101.343 | -38.827 | 0.000 |
| 14 | M3最小 | 10 | 4 | -7.472 | 14.680 | 212.994 | -50.010 | -21.327 | -0.002 |
| 12 | N1最大 | 10 | 2 | 4.028 | -9.228 | 161.608 | 25.979 | 16.182 | 0.000 |
| 12 | N2最大 | 3 | 1 | -0.323 | 32.797 | -195.420 | -92.173 | -1.020 | 0.000 |
| 12 | N3最大 | 6 | 1 | 1.912 | -35.640 | 383.644 | 99.987 | 6.019 | -0.000 |
| 12 | M1最大 | 6 | 1 | 1.912 | -35.640 | 383.644 | 99.987 | 6.019 | -0.000 |
| 12 | M2最大 | 10 | 2 | 4.028 | -9.228 | 161.608 | 25.979 | 16.182 | 0.000 |
| 12 | M3最大 | 10 | 3 | 0.143 | -12.372 | 164.295 | 41.764 | -0.667 | 0.002 |
| 12 | 合力最大 | 6 | 1 | 1.912 | -35.640 | 383.644 | 99.987 | 6.019 | -0.000 |
| 12 | N1最小 | 10 | 1 | -1.855 | -9.081 | 163.247 | 25.247 | -9.335 | -0.000 |
| 12 | N2最小 | 6 | 1 | 1.912 | -35.640 | 383.644 | 99.987 | 6.019 | -0.000 |
| 12 | N3最小 | 3 | 1 | -0.323 | 32.797 | -195.420 | -92.173 | -1.020 | 0.000 |
| 12 | M1最小 | 3 | 1 | -0.323 | 32.797 | -195.420 | -92.173 | -1.020 | 0.000 |
| 12 | M2最小 | 10 | 1 | -1.855 | -9.081 | 163.247 | 25.247 | -9.335 | -0.000 |
| 12 | M3最小 | 10 | 4 | 2.030 | -5.936 | 160.560 | 9.462 | 7.514 | -0.002 |
| 10 | N1最大 | 10 | 2 | 5.612 | 9.743 | 150.387 | -27.580 | 21.586 | -0.000 |
| 10 | N2最大 | 6 | 1 | 4.787 | 37.318 | 358.067 | -105.987 | 15.115 | -0.000 |
| 10 | N3最大 | 6 | 1 | 4.787 | 37.318 | 358.067 | -105.987 | 15.115 | -0.000 |
| 10 | M1最大 | 3 | 1 | -1.233 | -33.781 | -183.389 | 95.792 | -3.374 | 0.000 |
| 10 | M2最大 | 10 | 2 | 5.612 | 9.743 | 150.387 | -27.580 | 21.586 | -0.000 |
| 10 | M3最大 | 10 | 3 | 3.319 | 6.766 | 149.378 | -12.267 | 11.618 | 0.002 |
| 10 | 合力最大 | 6 | 1 | 4.787 | 37.318 | 358.067 | -105.987 | 15.115 | -0.000 |
| 10 | N1最小 | 3 | 1 | -1.233 | -33.781 | -183.389 | 95.792 | -3.374 | 0.000 |
| 10 | N2最小 | 3 | 1 | -1.233 | -33.781 | -183.389 | 95.792 | -3.374 | 0.000 |
| 10 | N3最小 | 3 | 1 | -1.233 | -33.781 | -183.389 | 95.792 | -3.374 | 0.000 |
| 10 | M1最小 | 6 | 1 | 4.787 | 37.318 | 358.067 | -105.987 | 15.115 | -0.000 |
| 10 | M2最小 | 10 | 1 | -0.595 | 9.884 | 152.158 | -28.293 | -5.341 | 0.000 |
| 10 | M3最小 | 10 | 4 | 1.698 | 12.861 | 153.167 | -43.606 | 4.627 | -0.002 |
| 8 | N1最大 | 10 | 2 | 2.294 | -9.045 | 163.059 | 25.184 | 11.262 | 0.001 |
| 8 | N2最大 | 3 | 1 | 0.198 | 32.774 | -195.011 | -92.487 | 0.456 | 0.000 |
| 8 | N3最大 | 6 | 1 | -1.154 | -35.608 | 383.097 | 100.280 | -2.679 | 0.000 |
| 8 | M1最大 | 6 | 1 | -1.154 | -35.608 | 383.097 | 100.280 | -2.679 | 0.000 |
| 8 | M2最大 | 10 | 2 | 2.294 | -9.045 | 163.059 | 25.184 | 11.262 | 0.001 |
| 8 | M3最大 | 10 | 3 | -1.594 | -12.222 | 163.826 | 41.226 | -5.590 | 0.002 |
| 8 | 合力最大 | 6 | 1 | -1.154 | -35.608 | 383.097 | 100.280 | -2.679 | 0.000 |
| 8 | N1最小 | 10 | 1 | -3.589 | -9.241 | 161.441 | 26.153 | -14.254 | -0.000 |
| 8 | N2最小 | 6 | 1 | -1.154 | -35.608 | 383.097 | 100.280 | -2.679 | 0.000 |
| 8 | N3最小 | 3 | 1 | 0.198 | 32.774 | -195.011 | -92.487 | 0.456 | 0.000 |
| 8 | M1最小 | 3 | 1 | 0.198 | 32.774 | -195.011 | -92.487 | 0.456 | 0.000 |
| 8 | M2最小 | 10 | 1 | -3.589 | -9.241 | 161.441 | 26.153 | -14.254 | -0.000 |
| 8 | M3最小 | 10 | 4 | 0.298 | -6.063 | 160.674 | 10.111 | 2.597 | -0.002 |
| 6 | N1最大 | 10 | 2 | 2.671 | 9.284 | 165.678 | -26.563 | 13.234 | 0.000 |
| 6 | N2最大 | 6 | 1 | -1.052 | 35.632 | 388.828 | -100.847 | -1.457 | 0.000 |
| 6 | N3最大 | 6 | 1 | -1.052 | 35.632 | 388.828 | -100.847 | -1.457 | 0.000 |
| 6 | M1最大 | 3 | 1 | 0.595 | -32.703 | -197.606 | 92.369 | 1.811 | 0.000 |
| 6 | M2最大 | 10 | 2 | 2.671 | 9.284 | 165.678 | -26.563 | 13.234 | 0.000 |
| 6 | M3最大 | 10 | 3 | 0.362 | 6.110 | 163.245 | -10.529 | 3.219 | 0.002 |
| 6 | 合力最大 | 6 | 1 | -1.052 | 35.632 | 388.828 | -100.847 | -1.457 | 0.000 |
| 6 | N1最小 | 10 | 1 | -3.539 | 9.095 | 163.904 | -25.613 | -13.696 | 0.000 |
| 6 | N2最小 | 3 | 1 | 0.595 | -32.703 | -197.606 | 92.369 | 1.811 | 0.000 |
| 6 | N3最小 | 3 | 1 | 0.595 | -32.703 | -197.606 | 92.369 | 1.811 | 0.000 |
| 6 | M1最小 | 6 | 1 | -1.052 | 35.632 | 388.828 | -100.847 | -1.457 | 0.000 |
| 6 | M2最小 | 10 | 1 | -3.539 | 9.095 | 163.904 | -25.613 | -13.696 | 0.000 |
| 6 | M3最小 | 10 | 4 | -1.230 | 12.270 | 166.336 | -41.647 | -3.681 | -0.002 |
| 4 | N1最大 | 10 | 2 | 5.953 | -12.201 | 178.552 | 33.877 | 21.625 | 0.001 |
| 4 | N2最大 | 3 | 1 | -0.849 | 29.470 | -170.705 | -83.544 | -2.507 | 0.000 |
| 4 | N3最大 | 6 | 1 | 5.747 | -38.618 | 395.901 | 108.984 | 16.857 | 0.000 |
| 4 | M1最大 | 6 | 1 | 5.747 | -38.618 | 395.901 | 108.984 | 16.857 | 0.000 |
| 4 | M2最大 | 10 | 2 | 5.953 | -12.201 | 178.552 | 33.877 | 21.625 | 0.001 |
| 4 | M3最大 | 10 | 3 | 2.465 | -15.887 | 181.924 | 52.478 | 5.908 | 0.002 |
| 4 | 合力最大 | 6 | 1 | 5.747 | -38.618 | 395.901 | 108.984 | 16.857 | 0.000 |
| 4 | N1最小 | 3 | 1 | -0.849 | 29.470 | -170.705 | -83.544 | -2.507 | 0.000 |
| 4 | N2最小 | 6 | 1 | 5.747 | -38.618 | 395.901 | 108.984 | 16.857 | 0.000 |
| 4 | N3最小 | 3 | 1 | -0.849 | 29.470 | -170.705 | -83.544 | -2.507 | 0.000 |
| 4 | M1最小 | 3 | 1 | -0.849 | 29.470 | -170.705 | -83.544 | -2.507 | 0.000 |
| 4 | M2最小 | 3 | 1 | -0.849 | 29.470 | -170.705 | -83.544 | -2.507 | 0.000 |
| 4 | M3最小 | 10 | 4 | 4.141 | -8.896 | 178.598 | 17.154 | 13.467 | -0.002 |
| 2 | N1最大 | 10 | 2 | 6.574 | 12.757 | 178.043 | -36.602 | 24.280 | 0.000 |
| 2 | N2最大 | 6 | 1 | 6.491 | 38.691 | 394.751 | -109.275 | 19.882 | 0.000 |
| 2 | N3最大 | 6 | 1 | 6.491 | 38.691 | 394.751 | -109.275 | 19.882 | 0.000 |
| 2 | M1最大 | 3 | 1 | -0.801 | -29.170 | -170.256 | 82.022 | -2.140 | 0.000 |
| 2 | M2最大 | 10 | 2 | 6.574 | 12.757 | 178.043 | -36.602 | 24.280 | 0.000 |
| 2 | M3最大 | 10 | 3 | 4.490 | 9.065 | 178.061 | -17.968 | 14.890 | 0.002 |
| 2 | 合力最大 | 6 | 1 | 6.491 | 38.691 | 394.751 | -109.275 | 19.882 | 0.000 |
| 2 | N1最小 | 3 | 1 | -0.801 | -29.170 | -170.256 | 82.022 | -2.140 | 0.000 |
| 2 | N2最小 | 3 | 1 | -0.801 | -29.170 | -170.256 | 82.022 | -2.140 | 0.000 |
| 2 | N3最小 | 3 | 1 | -0.801 | -29.170 | -170.256 | 82.022 | -2.140 | 0.000 |
| 2 | M1最小 | 6 | 1 | 6.491 | 38.691 | 394.751 | -109.275 | 19.882 | 0.000 |
| 2 | M2最小 | 3 | 1 | -0.801 | -29.170 | -170.256 | 82.022 | -2.140 | 0.000 |
| 2 | M3最小 | 10 | 4 | 3.068 | 16.058 | 181.398 | -53.296 | 8.485 | -0.002 |

* 1. 线性内力
     1. **线性组合包络**





线性组合轴力N最大包络云图:kN（整体）

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 轴力N最大的前10个单元的内力（单位：m, kN, kN.m） | | | | | | | | | | |
| 序号 | 单元号 | 组合号 | 组合序号 | 位置 | 轴力N | 剪力Q2 | 剪力Q3 | 扭矩M | 弯矩M2 | 弯矩M3 |
| 1 | 7 | 12 | 1 | 0.000 | 394.519 | -45.072 | 10.672 | 0.000 | -60.699 | -253.114 |
| 2 | 3 | 12 | 1 | 0.000 | 369.056 | -52.081 | 1.034 | 0.000 | -6.048 | -295.535 |
| 3 | 6 | 12 | 1 | 0.000 | 364.861 | 52.203 | -0.874 | 0.000 | 4.655 | 297.053 |
| 4 | 4 | 12 | 1 | 0.000 | 364.194 | 52.164 | 0.509 | 0.000 | -3.179 | 296.244 |
| 5 | 5 | 12 | 1 | 0.000 | 342.552 | -53.919 | -2.770 | 0.001 | 15.499 | -305.383 |
| 6 | 2 | 12 | 1 | 0.000 | 334.489 | 48.423 | -2.436 | 0.000 | 13.519 | 274.453 |
| 7 | 1 | 12 | 1 | 0.000 | 333.625 | -48.058 | -2.536 | 0.000 | 14.200 | -273.227 |
| 8 | 8 | 12 | 1 | 0.000 | 331.810 | 45.695 | 1.944 | 0.001 | -11.321 | 262.134 |
| 9 | 149 | 12 | 1 | 0.000 | 51.726 | 94.306 | 0.038 | -0.003 | -0.082 | 339.843 |
| 10 | 148 | 12 | 1 | 0.000 | 51.676 | -42.328 | 0.018 | -0.002 | -0.046 | 341.076 |





线性组合轴力N最小包络云图:kN（整体）

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 轴力N最小的前10个单元的内力（单位：m, kN, kN.m） | | | | | | | | | | |
| 序号 | 单元号 | 组合号 | 组合序号 | 位置 | 轴力N | 剪力Q2 | 剪力Q3 | 扭矩M | 弯矩M2 | 弯矩M3 |
| 1 | 7 | 6 | 1 | 8.500 | -668.931 | 51.130 | -20.410 | 0.000 | -55.590 | -147.769 |
| 2 | 2 | 6 | 1 | 8.500 | -567.794 | -56.237 | 8.157 | 0.000 | 23.925 | 158.734 |
| 3 | 1 | 6 | 1 | 8.500 | -566.151 | 56.318 | 9.200 | 0.000 | 28.152 | -159.033 |
| 4 | 8 | 6 | 1 | 8.500 | -564.429 | -52.955 | -6.905 | -0.000 | -18.683 | 146.074 |
| 5 | 3 | 6 | 1 | 8.500 | -559.502 | 52.239 | -1.524 | 0.000 | -2.187 | -147.833 |
| 6 | 6 | 6 | 1 | 8.500 | -552.091 | -52.258 | 2.715 | -0.000 | 8.545 | 146.622 |
| 7 | 4 | 6 | 1 | 8.500 | -551.293 | -52.210 | -1.644 | 0.000 | -3.820 | 147.048 |
| 8 | 5 | 6 | 1 | 8.500 | -515.432 | 54.677 | 6.809 | -0.000 | 21.465 | -155.277 |
| 9 | 159 | 6 | 1 | 0.000 | -55.712 | -137.457 | -0.110 | 0.017 | 0.225 | -439.734 |
| 10 | 13 | 6 | 1 | 0.000 | -54.442 | -5.421 | -1.336 | 1.164 | 0.000 | -0.000 |





线性组合弯矩M2最大包络云图:kN.m（整体）

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 弯矩M2最大的前10个单元的内力（单位：m, kN, kN.m） | | | | | | | | | | |
| 序号 | 单元号 | 组合号 | 组合序号 | 位置 | 轴力N | 剪力Q2 | 剪力Q3 | 扭矩M | 弯矩M2 | 弯矩M3 |
| 1 | 7 | 6 | 1 | 0.000 | -651.647 | 51.130 | -20.410 | 0.000 | 117.895 | 286.837 |
| 2 | 8 | 6 | 1 | 0.000 | -547.145 | -52.955 | -6.905 | -0.000 | 40.014 | -304.039 |
| 3 | 1 | 10 | 2 | 8.500 | -231.288 | 16.603 | 8.826 | 0.000 | 32.823 | -47.679 |
| 4 | 5 | 10 | 2 | 8.500 | -195.415 | 12.659 | 7.606 | -0.000 | 29.409 | -35.819 |
| 5 | 2 | 10 | 2 | 8.500 | -231.947 | -15.842 | 8.004 | 0.001 | 29.306 | 43.947 |
| 6 | 3 | 10 | 1 | 0.000 | -195.702 | 11.814 | -4.911 | 0.000 | 22.591 | 67.164 |
| 7 | 4 | 10 | 1 | 0.000 | -192.508 | -12.023 | -4.960 | -0.000 | 22.355 | -68.152 |
| 8 | 6 | 10 | 2 | 8.500 | -210.008 | -12.004 | 5.530 | 0.001 | 22.313 | 33.810 |
| 9 | 14 | 6 | 1 | 0.500 | 1.432 | 1.885 | 34.216 | 0.136 | 17.108 | -0.943 |
| 10 | 12 | 12 | 1 | 0.500 | 9.060 | 1.032 | 17.326 | -0.351 | 8.663 | -0.516 |





线性组合弯矩M2最小包络云图:kN.m（整体）

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 弯矩M2最小的前10个单元的内力（单位：m, kN, kN.m） | | | | | | | | | | |
| 序号 | 单元号 | 组合号 | 组合序号 | 位置 | 轴力N | 剪力Q2 | 剪力Q3 | 扭矩M | 弯矩M2 | 弯矩M3 |
| 1 | 7 | 12 | 1 | 0.000 | 394.519 | -45.072 | 10.672 | 0.000 | -60.699 | -253.114 |
| 2 | 1 | 6 | 1 | 0.000 | -548.867 | 56.318 | 9.200 | 0.000 | -50.046 | 319.666 |
| 3 | 2 | 6 | 1 | 0.000 | -550.510 | -56.237 | 8.157 | 0.000 | -45.411 | -319.277 |
| 4 | 5 | 6 | 1 | 0.000 | -498.148 | 54.677 | 6.809 | -0.000 | -36.413 | 309.480 |
| 5 | 8 | 10 | 1 | 8.500 | -230.878 | -14.917 | -7.371 | -0.000 | -26.620 | 40.624 |
| 6 | 6 | 10 | 2 | 0.000 | -192.724 | -12.004 | 5.530 | 0.001 | -24.696 | -68.225 |
| 7 | 4 | 10 | 1 | 8.500 | -209.792 | -12.023 | -4.960 | -0.000 | -19.807 | 34.047 |
| 8 | 3 | 10 | 1 | 8.500 | -212.986 | 11.814 | -4.911 | 0.000 | -19.152 | -33.250 |
| 9 | 12 | 6 | 1 | 0.500 | -10.412 | -0.067 | -32.175 | 0.170 | -16.088 | 0.033 |
| 10 | 14 | 12 | 1 | 0.500 | 0.125 | -1.001 | -17.712 | -0.512 | -8.856 | 0.500 |





线性组合弯矩M3最大包络云图:kN.m（整体）

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 弯矩M3最大的前10个单元的内力（单位：m, kN, kN.m） | | | | | | | | | | |
| 序号 | 单元号 | 组合号 | 组合序号 | 位置 | 轴力N | 剪力Q2 | 剪力Q3 | 扭矩M | 弯矩M2 | 弯矩M3 |
| 1 | 68 | 6 | 1 | 5.000 | -6.239 | -150.945 | -0.048 | 0.034 | -0.056 | 729.427 |
| 2 | 144 | 6 | 1 | 6.000 | -52.287 | -241.319 | -0.156 | -0.032 | -0.530 | 718.080 |
| 3 | 159 | 6 | 1 | 6.000 | -55.712 | -237.873 | -0.110 | 0.017 | -0.437 | 686.258 |
| 4 | 157 | 6 | 1 | 0.000 | -53.700 | 237.755 | -0.024 | -0.016 | 0.149 | 685.816 |
| 5 | 154 | 6 | 1 | 6.000 | -50.872 | -236.552 | -0.072 | 0.001 | -0.318 | 677.252 |
| 6 | 147 | 6 | 1 | 0.000 | -52.079 | 236.164 | -0.166 | 0.003 | 0.640 | 673.528 |
| 7 | 152 | 6 | 1 | 0.000 | -50.868 | 235.809 | -0.134 | -0.003 | 0.525 | 673.311 |
| 8 | 142 | 6 | 1 | 0.000 | -49.894 | 234.722 | -0.129 | -0.010 | 0.529 | 672.863 |
| 9 | 149 | 6 | 1 | 6.000 | -52.159 | -233.917 | -0.124 | 0.005 | -0.499 | 662.852 |
| 10 | 69 | 6 | 1 | 0.000 | 13.922 | 130.863 | 0.030 | 0.033 | -0.244 | 611.574 |





线性组合弯矩M3最小包络云图:kN.m（整体）

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 弯矩M3最小的前10个单元的内力（单位：m, kN, kN.m） | | | | | | | | | | |
| 序号 | 单元号 | 组合号 | 组合序号 | 位置 | 轴力N | 剪力Q2 | 剪力Q3 | 扭矩M | 弯矩M2 | 弯矩M3 |
| 1 | 158 | 6 | 1 | 3.000 | -54.376 | 0.044 | -0.062 | 0.000 | 0.044 | -514.912 |
| 2 | 143 | 6 | 1 | 3.000 | -51.156 | -0.942 | -0.108 | -0.010 | -0.067 | -506.704 |
| 3 | 148 | 6 | 1 | 3.000 | -52.096 | -0.468 | -0.087 | 0.004 | -0.026 | -497.411 |
| 4 | 153 | 6 | 1 | 3.000 | -50.849 | 0.087 | -0.072 | -0.001 | -0.035 | -497.159 |
| 5 | 154 | 12 | 1 | 6.000 | 50.783 | 180.669 | 0.010 | -0.002 | 0.047 | -489.188 |
| 6 | 147 | 12 | 1 | 0.000 | 51.668 | -180.639 | 0.049 | -0.003 | -0.183 | -487.546 |
| 7 | 152 | 12 | 1 | 0.000 | 50.785 | -180.266 | 0.023 | 0.003 | -0.088 | -487.060 |
| 8 | 149 | 12 | 1 | 6.000 | 51.726 | 179.375 | 0.038 | -0.003 | 0.146 | -481.197 |
| 9 | 144 | 12 | 1 | 6.000 | 43.977 | 167.097 | 0.064 | 0.033 | 0.204 | -466.610 |
| 10 | 159 | 12 | 1 | 6.000 | 46.165 | 165.660 | 0.021 | 0.002 | 0.076 | -448.665 |

* 1. 线性位移
     1. **线性最大位移**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 线性组合最大最小位移表 | | | | | | |
| 最不利项 | 节点 | 组合名 | Ux | Uy | Uz | Uxyz |
| X方向位移最大 | 22 | 组合3 (恒0+风3) | 6.332 | 0.000 | 0.000 | 6.332 |
| Y方向位移最大 | 28 | 组合10-情况3 (恒0+0.5活1+水平地震) | 2.603 | 2.572 | -24.748 | 25.017 |
| Z方向位移最大 | 65 | 组合3 (恒0+风3) | -0.028 | 0.058 | 32.486 | 32.486 |
| 空间位移最大 | 51 | 组合6 (恒0+0.7活1+风2) | -1.080 | -0.605 | -64.518 | 64.530 |
| X方向位移最小 | 22 | 组合6 (恒0+0.7活1+风2) | -14.066 | 0.000 | 0.000 | 14.066 |
| Y方向位移最小 | 54 | 组合10-情况4 (恒0+0.5活1+水平地震) | -1.835 | -2.673 | -13.315 | 13.704 |
| Z方向位移最小 | 51 | 组合6 (恒0+0.7活1+风2) | -1.080 | -0.605 | -64.518 | 64.530 |



线性组合最大最小位移图（整体）

1. 验算结果
   1. 杆件应力比限值分布图

|  |  |  |
| --- | --- | --- |
| 应力比限值表 | | |
| 序号 | 应力比下限 | 应力比上限 |
| 1 | 0 | 1 |





应力比限值分布图（整体）

* 1. 杆件应力比分布图
  2. 杆件验算结果云图
     1. **强度应力比**





按“强度应力比”显示构件颜色（整体）

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| “强度应力比”最大的前 10 个单元的验算结果（所在组合号／情况号） | | | | | | | | | |
| 序号 | 单元号 | 强度 | 绕2轴整体稳定 | 绕3轴整体稳定 | 沿2轴抗剪应力比 | 沿3轴抗剪应力比 | 沿2轴长细比 | 沿3轴长细比 | 结果 |
| 1 | 144 | 0.727(6/1) | - | - | 0.257 | 0.000 | 91 | 72 | 满足 |
| 2 | 68 | 0.725(6/1) | - | - | 0.161 | 0.000 | 76 | 40 | 满足 |
| 3 | 7 | 0.717(6/1) | - | - | 0.069 | 0.011 | 86 | 52 | 满足 |
| 4 | 159 | 0.696(6/1) | - | - | 0.253 | 0.000 | 91 | 72 | 满足 |
| 5 | 157 | 0.693(6/1) | - | - | 0.253 | 0.000 | 91 | 72 | 满足 |
| 6 | 154 | 0.685(6/1) | - | - | 0.252 | 0.000 | 91 | 72 | 满足 |
| 7 | 147 | 0.684(6/1) | - | - | 0.251 | 0.000 | 91 | 72 | 满足 |
| 8 | 152 | 0.682(6/1) | - | - | 0.251 | 0.000 | 91 | 72 | 满足 |
| 9 | 142 | 0.682(6/1) | - | - | 0.250 | 0.000 | 91 | 72 | 满足 |
| 10 | 149 | 0.672(6/1) | - | - | 0.249 | 0.000 | 91 | 72 | 满足 |

* + 1. **绕2轴稳定应力比**





按“绕2轴稳定应力比”显示构件颜色（整体）

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| “绕2轴稳定应力比”最大的前 10 个单元的验算结果（所在组合号／情况号） | | | | | | | | | |
| 序号 | 单元号 | 强度 | 绕2轴整体稳定 | 绕3轴整体稳定 | 沿2轴抗剪应力比 | 沿3轴抗剪应力比 | 沿2轴长细比 | 沿3轴长细比 | 结果 |
| 1 | 111 | 0.484 | - | - | 0.075 | 0.000 | 140 | 78 | 满足 |
| 2 | 144 | 0.727 | - | - | 0.257 | 0.000 | 91 | 72 | 满足 |
| 3 | 134 | 0.492 | - | - | 0.178 | 0.000 | 132 | 168 | 满足 |
| 4 | 132 | 0.492 | - | - | 0.178 | 0.000 | 132 | 168 | 满足 |
| 5 | 159 | 0.696 | - | - | 0.253 | 0.000 | 91 | 72 | 满足 |
| 6 | 157 | 0.693 | - | - | 0.253 | 0.000 | 91 | 72 | 满足 |
| 7 | 127 | 0.478 | - | - | 0.176 | 0.000 | 132 | 168 | 满足 |
| 8 | 137 | 0.476 | - | - | 0.175 | 0.000 | 132 | 168 | 满足 |
| 9 | 139 | 0.475 | - | - | 0.175 | 0.000 | 132 | 168 | 满足 |
| 10 | 106 | 0.438 | - | - | 0.151 | 0.000 | 140 | 78 | 满足 |

* + 1. **绕3轴稳定应力比**





按“绕3轴稳定应力比”显示构件颜色（整体）

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| “绕3轴稳定应力比”最大的前 10 个单元的验算结果（所在组合号／情况号） | | | | | | | | | |
| 序号 | 单元号 | 强度 | 绕2轴整体稳定 | 绕3轴整体稳定 | 沿2轴抗剪应力比 | 沿3轴抗剪应力比 | 沿2轴长细比 | 沿3轴长细比 | 结果 |
| 1 | 144 | 0.727 | - | - | 0.257 | 0.000 | 91 | 72 | 满足 |
| 2 | 68 | 0.725 | - | - | 0.161 | 0.000 | 76 | 40 | 满足 |
| 3 | 159 | 0.696 | - | - | 0.253 | 0.000 | 91 | 72 | 满足 |
| 4 | 157 | 0.693 | - | - | 0.253 | 0.000 | 91 | 72 | 满足 |
| 5 | 154 | 0.685 | - | - | 0.252 | 0.000 | 91 | 72 | 满足 |
| 6 | 147 | 0.684 | - | - | 0.251 | 0.000 | 91 | 72 | 满足 |
| 7 | 152 | 0.682 | - | - | 0.251 | 0.000 | 91 | 72 | 满足 |
| 8 | 142 | 0.682 | - | - | 0.250 | 0.000 | 91 | 72 | 满足 |
| 9 | 149 | 0.672 | - | - | 0.249 | 0.000 | 91 | 72 | 满足 |
| 10 | 69 | 0.611 | - | - | 0.139 | 0.000 | 91 | 40 | 满足 |