|  |  |
| --- | --- |
| **ARTICLE TYPE** |  |

**Table 1** Corresponding factors of complex weather

|  |  |
| --- | --- |
| **Complex weather** | **Main influencing factors** |
| **typhoon** | Wind speed, air pressure |
| **heavy snow** | Temperature, humidity, and wind speed |
| **hail** | Temperature, humidity |
| **ice rain** | Rainfall, temperature |

**Table 2** 1-9 Scaling method determines the matrix assignment criteria

|  |  |
| --- | --- |
|  | **explain** |
| **1** | Both are equally important |
| **3** | The former is more important than the latter |
| **5** | The former is significantly more important than the latter |
| **7** | The former is strongly more important than the latter |
| **9** | The former is far more important than the latter |
| **2,4,6,8,** | The median of the judgment adjacent as described above |
| **Countdown to 1-9** | Represents the importance of the exchange order comparison of the corresponding quantity elements |

**Table 3** Judgment matrix assignment table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **temperature** | **wind speed** | **humidity** | **pressure** | **precipitation** |
| **temperature** | 1 | 3 | 5 | 7 | 9 |
| **wind speed** | 1/3 | 1 | 3 | 5 | 7 |
| **humidity** | 1/5 | 1/3 | 1 | 3 | 5 |
| **pressure** | 1/7 | 1/5 | 1/3 | 1 | 3 |
| **precipitation** | 1/9 | 1/7 | 1/5 | 1/3 | 1 |

**Table 4**  Geometric parameters of steel-core aluminum stranded wire

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **nominal cross** | **structure** | | **Calculate the section** | | |
| **Aluminum layer/mm** | **steel core /mm** | **Aluminum layer/** | **steel core /** | **amount to/** |
| 150/35 | 30/2.50 | 7/2.50 | 147.26 | 34.36 | 181.62 |

**Table 5** Material parameter settings

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **attribute** | **thermal expansivity** | | **thermal conductivity W/(m)** | | **conductivity；** | | **relative dielectric constant** | |
| **material** | **steel** | **aluminum** | **steel** | **aluminum** | **steel** | **aluminum** | **steel** | **aluminum** |
| price |  |  | 45 | 228 |  | 35.4 | 10 | 1.5 |

**Table 6**  Status assessment criteria

|  |  |  |
| --- | --- | --- |
| **order number** | **assessment criteria** | **Run status level** |
| 1 | In the stress change chart, the number of aluminum layer stress changes is less than or equal to 2 shares, in harmony with the temperature distribution chart | good |
| 2 | The number of aluminum layer stress changes is between 3 and 5, and is consistent with the temperature distribution diagram. | normal |
| 3 | The aluminum layer experiences significant stress changes, the steel core shows stress displacement, and this is inconsistent with the temperature distribution diagram. | danger |

**Table 7** Table corresponding to temperature distribution and stress changes

|  |  |  |  |
| --- | --- | --- | --- |
| **group number** | **Weighted temperature** | **Stress change diagram** | **Temperature distribution diagram** |
| 10 | 34.85374921 |  |  |
| 13 | 34.25867175 |  |  |
| 15 | 33.81442921 |  |  |
| 18 | 33.89627556 |  |  |

**Table 8** Improvement criteria for status assessment

|  |  |  |  |
| --- | --- | --- | --- |
| **order number** | **assessment criteria** | **The displacement deviation amount** | **Run status level** |
| 1 | In the stress variation diagram, the number of aluminum layers exhibiting stress changes is limited to a maximum of two strands, which aligns harmoniously with the temperature distribution map. | ≤±0.63mm | good |
| 2 | In the stress variation diagram, the number of aluminum strands exhibiting stress changes is between three and five, which is consistent with the temperature distribution map. | ≤±0.63mm | normal |
| 3 | The aluminum layer exhibits significant stress variation, and the steel core shows stress displacement, which is inconsistent with the temperature distribution map. | ＞±0.63mm | danger |

**Table 9**  Operation status assessment of 24 transmission line in Shenbei New Area on February 10th

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **group number** | **variation of stresses** | **The displacement change amount(mm)** | **State assessment** | **group number** | **variation of stresses** | **The displacement change amount(mm)** | **State assessment** |
| **1** | / | 0.01121 | good | **13** | aluminium steel \*2 | 0.00738 | normal |
| **2** | / | 0.00531 | good | **14** | aluminium steel \*1 | 0.00662 | normal |
| **3** | aluminium steel \*1 | 0.01186 | normal | **15** | aluminium steel \*2 | 0.07507 | normal |
| **4** | aluminium steel \*1 | 0.00731 | normal | **16** | aluminium steel \*1 | 0.04541 | normal |
| **5** | aluminium steel \*1 | 0.00731 | normal | **17** | aluminium steel \*1 | 0.00649 | normal |
| **6** | aluminium steel \*1 | 0.03292 | normal | **18** | aluminium steel \*2 | 0.18569 | normal |
| **7** | aluminium steel \*1 | 0.00531 | normal | **19** | / | 0.08698 | good |
| **8** | aluminium steel \*1 | 0.01233 | normal | **20** | aluminium steel \*2 | 0.05016 | normal |
| **9** | aluminium steel \*1 | 0.03990 | normal | **21** | aluminium steel \*2 | 0.00809 | normal |
| **10** | aluminium steel \*3 | 0.09265 | normal | **22** | aluminium steel \*2 | 0.05436 | normal |
| **11** | / | 0.00439 | good | **23** | aluminium steel \*1 | 0.01046 | normal |
| **12** | / | 0.00439 | good | **24** | aluminium steel \*1 | 0.02739 | normal |