Grid design instructions

I. Project overview

1. Project name: Algeria Grid works
2. Structural type of the mesh frame: this mesh frame is a four-angle cone bolt ball carbon steel mesh frame.
3. See the frame plan.
4. Organized drainage of the network frame.
5. Network frame support form: multi-column point support.
6. The frame in the layout plan of the network frame is the support, and the support reverse force unit is Qianniu (KN).
7. Design service life: 50 years
8. Structural safety level: Grade II.
9. Structural importance system: 1.0

II. Design specifications: (Construction must follow the following specifications)

1. Code for Load of Building Structure, GB50009-2012
2. Code for Seismic Design GB50011-2010 (2016)
3. Technical Specification for Space Grid Structure, JGJ7-2010
4. Design Standard for Steel Structure GB50017-2017
5. " Steel Structure Engineering Construction Quality Acceptance Standard, GB50205-2020
6. Steel Grid Industry Standard JGJ75.1~75.3--91
7. Standard for Network Construction Engineering Quality Inspection and Evaluation(JGJ78-91)
8. Technical Specification for Cold-bent Thin-Wall Steel Structure GB50018-2016
9. Code for Fire Design GBJ50016-2014 (2018)
10. Welding Code for Building Steel Structure JGJ81-2002
11. High-strength bolts for steel bolts GBT16939-2016
12. Technical Code for Fire Protection of Building Steel Structure GB51249-2017
13. Unified Standard for Building Structure Reliability Design GB 50068-2018.

III. Design technical parameters

1. Quiet load of 0.50KN / m2
2. The upper load is 0.50KN / m2
3. Lower string static load of 0.30KN / m2
4. Basic air pressure: 0.50KN / m2
5. Basic snow pressure: 0.30KN / m2
6. Temperature change value: ± 30 degrees.
7. Earthquake fortification intensity: 7 degrees, basic seismic acceleration value of 0.15g, Design seismic group of the site is the first group.
   Site category is three categories, network frame damping ratio 0.02, key rod length fine ratio pull rod 180, pressure rod 150.
8. Ground roughness category: Class B.
9. The dead weight of the network frame is automatically formed by the computer program.
10. The load must act on the node, and shall not be overloaded in use, and the rod parts shall not bear the transverse load.
11. The computer-aided design system (MST2020)

Iv. Material requirements

1. Steel pipe: The steel used in the structure shall meet the following requirements, and shall have a quality certificate and re-inspection report.
A. The ratio of measured yield strength of steel and tensile strength of steel shall not be greater than 0.85;
b. Steel shall have obvious yield steps, and elongation shall not be less than 20%;
c. Steel shall have good soldability and qualified impact toughness;
d. Adopt Q235B steel, and the material meets the relevant regulations of the material compliance (carbon structural steel GB / T7002006),
And has the tensile strength, elongation rate, yield strength, cold bending test and sulfur, phosphorus and carbon content of qualified assurance.Steel pipes may be high-frequency welded pipes or seamless steel pipes,
The product quality meets the provisions of the <Straight Joint Welded Steel Pipe (GB / T 13793) or the Seamless Steel Pipe for Structure (GB / T81 62).
2. Steel ball: the bolt ball shall be forged with No.45 steel specified in High Quality Carbon Structural Steel GB / T699-2015,
   The surface shall be smooth, no cracks, no excessive burning and no hemp.
3. High strength bolts: use <<steel frame bolt ball nodes>> (GBT16939-2016)
   Designated 40Cr, 20MnTiB, 35CrMo, 35VB steel, finished permitted.any
   Quenched crack of a depth or any length.The performance grade of high strength bolts after quality adjustment must meet
   <<Materials with high strength hehexagonal head bolts>> (GB1228),
The thread shall conform to level 6g in <<ordinary thread tolerance and coordination>> (GB197),
   and the surface shall be blackened
   And apply anti-rust oil.
4. Seal the plate.Tone head: the material shall meet the Q235B steel specified in GB / T700, steel pipe diameter
   The cone head of 75 must be used. Any section of the joint weld and the cone head shall be strong with the connected steel pipe, and the thickness shall be guaranteed
Requirements for proving strength and deformation.Seal plate, cone head appearance shall not be cracked.Over-burn and oxidized skin, and test reports.
5. Sleeve: The material shall meet the Q235B steel specified in Carbon Structural Steel GB / T700 or the Technical Conditions for Low Alloy Structural Steel
(GB1591) 16Mn Steel or 45 Steel Steel Number and General Technical Conditions (GB699).
The sleeve shall look without cracks,Over-burn and oxidized skin.
6. Requirements for performance index of anchor bolt rod: the ratio of measured tensile strength of anchor bolt rod and reinforcement reinforcement to that of yield strength shall not be less than 1.25;
The ratio of the measured yield strength value to the standard yield strength value shall not be greater than 1.3, and the measured total elongation value at the maximum tensile force shall not be less than 9%.
7. Fastening screws: the materials use 40 chromium steel or 40 boron steel or No.70 spring steel.
8. Welding strip
A) When the base material is Q235B steel, E4303 shall be adopted and whose performance shall meet the provisions of Carbon Steel Welder (GB5117)
b) The base material is E43xx with No.45 welding strip, and the ball is preheated to 150-200 degrees C before welding;
c) If the above two types of solds adopt CO 2 gas protection welding, the welding wire shall comply with Steel Welds for CO 2 Gas Protection Welding (GB8110).
9. All the materials used in the grid rack shall be with the factory qualification certificate, and the materials without the factory certificate must be tested and confirmed before they can be used.
The quality of all products shall meet the Steel Grid Industry Standards.

V. Welding seam

1. Steel pipe and sealing plate.When the cone head forms a rod, the butt welds at both ends are fully fused welds.
2. The welding of the support bolt ball and the base must be preheated to the ball to 150-200 degrees C and using the positioning frame before welding;
3. Welds not indicated shall be full of welding, and the minimum weld height is 1.5 times the minimum member thickness and not less than Hf=6mm.
4. Double welding and splicing of steel pipe
A) Steel pipe butt weld, there shall not be two joints between the two adjacent nodes, and the minimum takeover length shall be greater than
At 800mm, and the pull rod shall not butt;
b) Steel pipe butt joint section, the angle of bilateral V joint is 60-90 degrees and the weld is high h> t (t is pipe wall)
If welded with a pad, the weld root width is b 2mm and the pad thickness is 0.5t;
c) After the steel pipe docking, the linear tolerance shall not exceed L / 1000 of the nominal length.
5. Welding quality inspection of the network frame shall reach <<steel structure engineering construction quality acceptance standard>>
Secondary standard requirements specified in (GB50205-2020).
6. The quality grade of weld shall comply with GB 50661 of the current national standard Code for Steel Structure
   The inspection method shall comply with the provisions of GB 50205, the current national standard, Code for Acceptance of Construction Quality of Steel Structure Works
   For the butt weld with steel of less than 6mm thickness, the weld quality grade shall not be determined by ultrasonic flaw detection.

Vi. Production and installation of the network frame

1. The production, transportation and installation of the mesh shall comply with the mesh Structure Design and Construction Regulations, JGJ7-2010 and Acceptance Standard for Construction Quality of Steel Structure Works GB50205-2020, Bolt Ball node JG11-2016, The Standard for Inspection and Acceptance of Steel Network Rack, JG12-1999.
2. It is necessary to preassemble the components before leaving the factory; if hoisting, pay attention to the arrangement of lifting points and take necessary temporary reinforcement measures.
3. The excessive plate of the embedded parts and the network frame support plate are connected by bolts, so its position and elevation shall be absolutely guaranteed during the construction.
   In order to meet the requirements of lightning protection, the network frame support and the embedded steel plate of the column are welded and connected, and the embedded steel plate and the column have a long electrical bar
   Welding connectivity.The axis dimension, elevation and flatness of the embedded parts shall meet the design requirements. The allowable deviation of the embedded parts is as follows:
a).The offset of the centerline and the positioning axis of the embedded parts is <15mm;
b).The elevation error is <30mm;
c).The steel plate flatness of the embedded parts is <3mm.
7. Grid frame for rust removal and coating
1. The steel must be completely removed before production, without rust, dust, oil, etc.The rust removal grade shall meet Sa2.5 in Steel Surface (GBT8923.4-2013)
2. After steel rust removal, paint and rust prevention primer according to the Standard for Construction Quality Acceptance of Steel Construction Engineering (GB50205-2020)
   Two courses (2X35um), two finishes (2X35um); total dry paint film thickness is not less than 125um, and paint film damage site during installation
   It shall be applied to no less than the protection level of adjacent parts; high strength bolts and bolt ball belt threads shall be coated with anti-rust oil.
3. The single fire resistance grade of this building is Grade II; the fire prevention grade of the network frame is Grade II. The fire prevention of the steel structure should meet the requirements of the construction specialty and meet the specified fire resistance limit beam: 1.5 hours piling bar.Steel support: 2.0 hours; the fire protection of steel structure by spraying (coating) fire protection coating; indoor concealed components, using expansion type fire protection coating,
The coating thickness of steel structure shall not be less than 3mm; the fire protection structure meets the GB51249-2017 for Building Steel Structure Fire Prevention
Section 4.2.1 Requirements.
4. Phase soluble test should be carried out between the selected steel structure fire prevention (anti-corrosion) paint and the anti-corrosion prevention paint (paint), which can only be used after the test is qualified.
5. After the installation of the network frame structure, the excess holes should be blocked with greasy seeds (completed when painting).
   Transportation.Prevent rain when stacked.

VIII. Enter network frame analysis results

1. Maximum tensile force / pressure (1644.2/-2369.2) KN.
2. Maximum deflection of Z=-178.2mm
3. The calculation result is only the grid part.Reinforced concrete column shall be determined by Party A according to the internal force design of the network frame support base.

IX. Illustration

Upper string bar — abdomen bar—lower string bar — node ○ support

X. In the materials table, the selected specifications shall not be replaced arbitrarily, if the materials are available
In difficult, the consent of the design unit, and the material length in the material table is
The the length of the material, the local real sample of the grid should be released before the material
Check the size of each steel pipe, the length of the material shall avoid negative error.
11. The construction drawing of the steel grid frame shall be carried out by the construction unit with the steel structure construction qualification
Detailed and sample out design and approved by Party A and the design institute

XII. The site size of the grid shall be retested before processing, and it can be processed and installed after it is correct.

Thirteen, other

Heavy objects are not allowed to be suspended on the rod parts in the installation and use of the network frame.

Steel mesh frames shall be regularly inspected, maintained and maintained, and vulnerable components shall be replaced.