

Design of Steel Structure of Large Span House Based on Engineering Construction Standard

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Abstract

In the rapid development of the construction industry, with the improvement of engineering construction standards, the traditional sense of the house design structure has been unable to meet the living needs of residents at the present stage. Therefore, this paper, on the basis of understanding the engineering construction standards, through the integration of the current housing construction situation, in-depth discussion of large-span house steel structure design key points.

Keywords

Engineering Construction Standard; Housing; Steel Structure; Long Span; Design.

1. Deformability

When designing a large-span steel house steel structure, it is necessary to ensure that it meets the requirements of stable bearing capacity and deformation capacity at the same time, and on the basis of meeting the strength requirements, ensure that the applied materials and the deformation requirements of the structural elasticity are consistent. Under normal circumstances, two methods can be used for design analysis, one is prestressing method, and the other is structural pre-arch method. By applying prestress to the design structure, it is helpful to improve the rigidity and load-bearing level of the long-span steel structure, control the elastoplastic deformation of the overall structure, and reduce the influence factors of damage to the structure.[1-2]

2. Calculation model

Designing large-span steel structures based on engineering construction standards must ensure that the selected materials have uniformity, so that the structural elasticity under the ideal state can be achieved, which is completely consistent with the calculation methods used in engineering construction at this stage. At the same time, make the connection model of the steel structure consistent with the actual application, so that the calculation difficulty can be reduced when the calculation is performed based on the model. In addition, combined with practical case analysis, it can be seen that the steel structure model has high calculation efficiency and strong validity. From an overall perspective, it occupies an important position in housing construction.[3-4]

3. Node structure

The biggest difference between steel structure and other structural design is that the component connection area is more complicated, which is also the focus of the design and construction personnel. Generally speaking, joint design must be explored from many aspects, such as stress conditions, construction standards and cross-sectional forms. After integrating and studying the above influencing factors, designers can propose more reasonable node forms based on their own work experience. On the basis of meeting the structural requirements, study and calculate relevant data from an objective perspective, and create a corresponding design model, and ensure that this model

will not change randomly during work. After the structural design reaches a certain ideal state, the designer must comprehensively think about the problem of secondary components, so that not only can fully demonstrate the construction concept of safe design, but also control the construction cost from the root cause. As shown in Figure 1 below, it is a node structure connected by welding.[4-7]

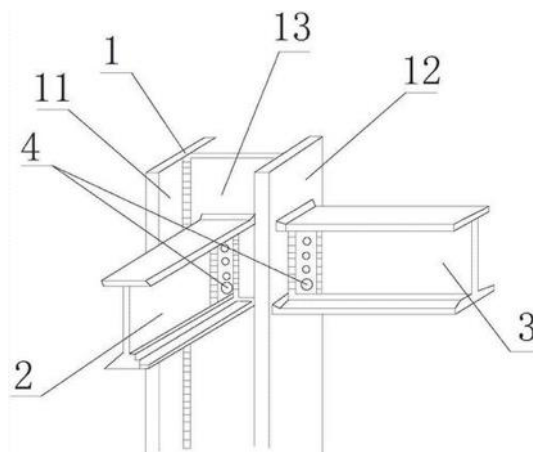


Figure 1. Node construction based on welding

4. Overall stiffness

According to the analysis of existing large-span steel structure design cases, it can be seen that the cross-section of most components is not affected by strength and stability, but is determined by the rigidity of the building structure, especially for those made of thin-walled components. In terms of building structure, this feature is even more remarkable. In this process, the design and construction personnel must do the following thinking when working to ensure that the final construction can meet the expected standards: First, ensure that the design meets the building standards and actual application requirements, so as to improve the quality of construction and optimize The level of steel structure design; second, to ensure the scientificity and perfection of the application of building materials, which will help speed up the efficiency of construction and ensure the quality of construction; third, focus on the requirements of rigid and flexible design in different areas during design. On the basis of the combination of rigidity and flexibility, the stability of the overall steel structure is improved, so that it can achieve coordinated deformation; fourth, as the basic requirement for designing large-span steel structures, designers need to learn from the basis of excellent domestic and foreign cases Above, effective design is carried out according to different types of construction standards and engineering requirements; fifth, steel structure is different from reinforced concrete structure, and a variety of influencing factors must be considered in the design, such as structural stability, structural units, and structural fire resistance. At the same time, it is necessary to enhance the corrosion resistance of the steel structure to ensure that the temperature of the environment it belongs to exceeds 150°C; sixth, on the basis of the requirements of the construction standard, it is necessary to implement anti-rust treatment, but now this treatment is very complicated , Whether it is cost expenditure or on-site construction, there are many problems. This requires design and construction personnel to conduct a comprehensive analysis of all unclear factors after understanding the market price changes and past treatment experience, so as to select appropriate and reasonable anti-corrosion measures one by one according to different structures and design schemes.

5. Load type

5.1 Permanent

This kind of load mainly appears in the roof and roof of the steel structure of large-span houses. As the roof covering material includes the weight of the roof panel, it also involves the roof insulation and waterproof layer. After studying the weight of the roof structure according to the empirical

formula or calculation model, assuming that the weight of the purlin is also in the roof structure, the content involved, such as the suspended ceiling structure of the pipeline, should also be considered in the calculation.

5.2 Variable

According to the analysis of the difference in housing engineering construction, the variable load in the large-span steel structure also has certain changes, which are embodied in the following points: First, the roof. The live load will be evenly distributed in this area. Designers can use the actual size of the horizontal projection area of the roof to perform calculations. Generally speaking, this standard is 0.5kn/m^2 . During the construction period, if there is an excessive load, it needs to be dealt with according to actual requirements. Second, snow. The steel structure roof design of the house should be adjusted according to the snow load. Generally speaking, only the snow load is lower than all snow before it can tilt down from the roof surface. Some blood will also fall and melt with the wind or roof heat. As shown in Figure 2 below, it is a grid roof with a large-span arched steel structure.

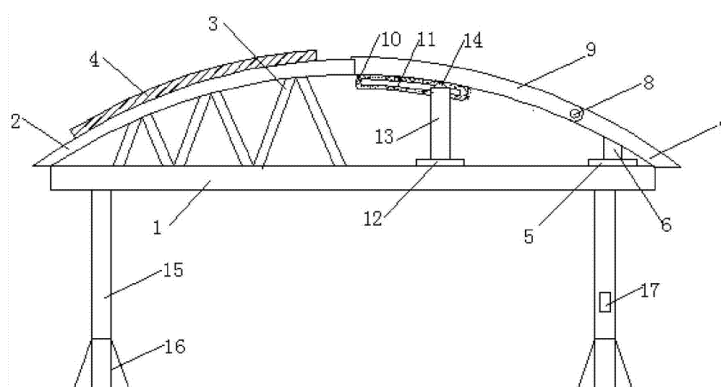


Figure 2. A large-span arch-shaped steel truss roof

5.3 Accidental

When designing large-span steel structures for houses, accidental factors such as earthquakes must be integrated and studied. When the ground has different degrees of vibration, the building will appear inertial force, and the accidental load at this time is directly related to the inherent characteristics of the steel structure, and will also be affected by ground motion. Therefore, designers can use the mode decomposition response spectrum method to study the seismic effects of buildings, or use the time history analysis method to study more complex structures.[9]

6. Conclusion

To sum up, in the continuous improvement of building construction design level, calculation methods based on large-span steel structure design are also improving. In order to obtain high-quality steel structures that meet the needs of residents and construction standards, construction units and designers must regard the needs of "people" as the core of construction management, and always pay attention to the development of large-span steel structures, and continue to learn from and learn from domestic and foreign excellence. The construction case, pay attention to adjusting the working ideas of construction design. This can not only fully demonstrate the practicability and advancement of large-span steel structure design, but also continuously optimize the construction level of urban housing in my country.

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