Research on Construction Technology of Extended Arm Truss of Super High-rise Building Steel Structure

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Abstract: As a special type of construction technology for super high-rise buildings, the steel structure outrigger truss construction technology can effectively improve the overall stability of buildings, taking into account the safety and economic characteristics. Based on the present situation of technology implementation, this paper first introduces the present situation of steel structure extension truss construction technology of super high-rise buildings, then explores the technical advantages and value of steel structure extension truss construction of super high-rise buildings, and puts forward the optimization strategy of steel structure extension truss construction technology of super high-rise buildings, hoping that it can effectively improve the construction application level and create conditions to promote the development of the industry.

1. Introduction:
With the acceleration of urbanization process, the current situation of urban land shortage is becoming more and more serious. In order to solve the contradiction between population density and living conditions, it is necessary to adopt super high-rise buildings to meet the needs of urban space. In this process, the construction technology and safety of super high-rise buildings have become one of the issues that must be considered. Compared with ordinary high-rise buildings, the construction technology of super high-rise buildings requires high cost, and relatively high reliability requirements. At present, the construction technology of steel structure outrigger truss is widely used in China. It has the characteristics of high mechanization level and fast construction speed, and can effectively reduce the lateral displacement of buildings. It also has a good promotion effect for improving the stability of buildings. From the point of view of the characteristics of technology itself, it also has some characteristics in construction technology points and control. In order to further explore the application strategy of steel outrigger truss in the construction of super high-rise buildings, the basic definition and characteristics of steel outrigger truss are introduced as follows.

2. General construction techniques of extended arm truss of super high-rise building steel structure
Extended arm is a truss structure with high stiffness, which can directly connect inner cylinder and outer column. Generally, it will select different types of extended arm components to construct according to the actual height. It is often used in high-rise and super-high-rise steel structures. Because the application of this construction technology can significantly enhance the axial force and the overturning force of the outer frame, the lateral stiffness of the structure will be strengthened accordingly. In the form of steel structure, literally it is mainly composed of steel, including section steel, steel plate and other types of steel truss, but also including bolts, rivets and so on. In the whole
construction process of steel structure outrigger truss, it can not only change the unstable quality control problems brought by the traditional construction mode, but also effectively bear the load stress and achieve comprehensive traction, so as to effectively enhance the level of safety protection and robustness of buildings. In addition, in the process of technology implementation, some new construction ideas can be integrated, suitable construction materials can be selected and used comprehensively, which can reduce waste and save a lot of costs for enterprises, and has good economic adaptability.

3. Function of extended arm truss construction technique for super high-rise building steel structure

Extended truss of steel structure is so widely used in super high-rise buildings, which is mainly determined by the following characteristics of construction technology of steel structure extended truss.

3.1. Compression resistance
In the construction of super high-rise buildings, steel structure extension truss construction technology is adopted. Different types of steel bars need to be selected for connection. After connection, the completed steel structure type can be formed. This special connection type of steel structure takes into account the strong security and robustness, to a certain extent, it can also ensure the construction safety and protection performance and compressive performance. In the application process of construction technology of steel structure outrigger truss, the technical advantages of the structure are integrated, and the integrity of construction technology of steel structure in the construction process of super high-rise building is also involved, which creates conditions for improving the compressive performance.

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3.2. Stability and Safety
Stability and safety is one of the most concerned problems in the construction of super high-rise buildings. Compared with other construction projects, the safety control of super high-rise buildings is more difficult, so on the basis of traditional construction technology, some control means need to be integrated. Steel structure can improve stability to a certain extent in the application process, but the gold price is still insufficient to rely on this technology, which requires the cooperation and connection of the extension truss. Through the application of steel structure extension truss construction technology, the environment can be significantly improved, the stability can be improved, and the overall service life can be extended to ensure the safety of construction process and the use safety of owners. From an objective point of view, the technical characteristics of steel structure outrigger truss construction determine that it can effectively reduce the impact of settlement, inclination and other issues, while improving the safety of the system in an all-round way, it also strengthens the aesthetic value of super high-rise buildings, which also makes the overall structure of the whole super high-rise buildings have been fully strengthened.

3.3. Ecology and Economic Adaptability
Compared with ordinary high-rise building construction, the application of traditional materials in super high-rise building will lead to time-consuming and laborious, but also lead to high maintenance costs in the later period, seriously affecting the economic efficiency of enterprises, and even lead to loss and bankruptcy of enterprises. In the process of construction technology selection, the steel structure extension truss construction technology can effectively improve the stability of the structure, but also can further meet the requirements of ecological environment protection, achieve recycling and reuse of materials, and also help to reduce the cost pressure of enterprises and achieve good economic
benefits. Most enterprises will be very cautious when building super high-rise buildings. This is because the overall investment of super high-rise buildings is huge, involving a large number of interest groups, and has a greater social influence. Therefore, in order to enhance the comprehensive competitiveness of enterprises, it is a reasonable and scientific choice to choose steel structure truss construction technology.

4. Application of steel structure extended arm truss construction technology in super high-rise buildings
In order to strengthen the application of steel structure extension truss construction technology, it is necessary to select appropriate control and coordination methods according to the actual construction needs of super high-rise buildings and the characteristics of owners, which mainly involve two levels of technology and management.

4.1. Construction Control at Technical Level

4.1.1. Preparatory Work
Preparations should be made before the construction of steel structure outrigger truss, which is also the basis for the successful completion of construction tasks in the later stage. Firstly, it is necessary to analyze and consider the construction technology, understand the actual needs of the building, design the scheme and allocate the detailed rules according to the need, and focus on the installation process, which is also the most likely link to affect the overall quality control in the construction; secondly, do a good job of pre-embedding treatment, which mainly involves the stiffness of the shear wall and reinforcement reinforcement. Only by ensuring the strength of concrete, can the overall quality of construction finally meet the expected requirements.

4.1.2. Prefabricated Assembly
Prefabricated assembly refers to the structural assembly of prefabricated steel structure outrigger truss on site. In this process, the level of quality control will also determine the actual control effect. In the process of component design and processing, it is necessary to meet the requirement of successful hoisting. While reducing the installation deviation, the chord and web joints of the steel structure outrigger truss are positioned. By reducing the deviation in the installation, the management requirements of prefabricated assembly can be more fulfilled. When drilling holes, precise installation and positioning should be carried out, and marking and recording should be done to ensure that the actual requirements of installation can be met.

4.1.3. Installation procedure normality
The optimization of installation of steel structure outrigger truss during construction mainly involves the normative aspects of the procedure. In fact, in order to ensure the installation quality, field measurements are needed in the process of component installation. Lever correction can be carried out by means of lifting the boom tower, and high-strength bolts can be selected for fixing. At the same time, technology can be further mastered, with a considerable degree of safety awareness and construction efficiency. In the application process of welding technology, it is necessary to configure tools well in advance, and the construction speed and efficiency can be significantly improved. In this process, there are certain requirements for the professional quality and management level of technicians, which need considerable degree of construction experience and technical level to achieve. When choosing the standard installation conditions, we should not depend too much on the past successful experience, or we should combine the specific building scale and working conditions to make the selection, so as to ensure the adaptability of the technology to meet the requirements.

4.2. Construction control in management
4.2.1. Establishing Scientific Management System

Scientific management system needs to be standardized in order to reflect the value. In order to solve these problems, it is necessary to establish a scientific, perfect and standardized management system. Through the management system to manage and restrict the specific behavior of the relevant construction personnel. In the whole process of supervision, it is necessary to further enhance the safety responsibility consciousness of personnel, establish a reasonable post responsibility system, and ensure that the management method of responsibility to people can be implemented. In the actual construction process, we must do a good job in controlling steel quality, strictly controlling materials and reducing the impact and problems caused by unreasonable selection of construction costs or quality not up to the standard, so as to effectively guarantee the enforceability of scientific management system. In order to achieve this goal, senior managers of enterprises also need to raise awareness, clarify management tasks, ensure upstream and downstream effectiveness, and truly integrate management tasks with construction technology.

4.2.2. Strengthen the Training and Management of Construction Personnel

As the main participant of the whole construction, whether the professional quality of the construction personnel can meet the construction technology requirements is one of the issues that enterprises generally pay attention to. To solve this problem, on the one hand, we need to strengthen pre-job training, improve the professional quality of personnel, strengthen construction skills training and professional quality training, so as to establish a good working attitude and overall concept, recognize the relationship between safety and scientificity in work, and improve the overall operation level; on the other hand, we need to do a good job in personnel management, as well as improve management. Professional quality of personnel better meet the development requirements of construction technology, so as to ensure that the construction level of personnel can achieve the desired results as far as possible, in order to further enhance the application level of construction technology, reflecting the application advantages and values of steel structure extension truss construction technology.

5. Conclusion:

To sum up, with the acceleration of the urbanization process, super-high-rise buildings have gradually become the main direction of future building development. In the process of technical selection of construction, compressive performance, stability, economy and other aspects should be taken into account. As one of the widely used technologies, steel structure boom truss has prominent advantages in all aspects and relatively high technology maturity, making it a good technical choice. In the process of technology implementation, in order to reflect the advantages and values of steel structure boom truss construction technology, it is necessary to do a good job in the overall control of the technical level and management level, so as to fundamentally ensure the smooth implementation of construction technology, and lay a solid foundation for the rapid development of the construction industry.

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