On the Application of Steel Structure Technology in Civil Engineering Construction

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Keywords: Civil engineering construction; Steel structure; Apply

Abstract: Steel structure technology using steel bar as main raw material has strong compression resistance, which makes buildings framed by steel structure technology more stable on the whole. It is also because the steel bar has good toughness, so it has good compressive strength. Compared with traditional concrete structures, steel structure technology is now widely used in most construction projects. Steel structure has the same advantages as steel bar in compressive strength. After combination, steel structure is more compressive and tough. In the process of civil engineering construction, the construction party is not scientific and reasonable, and the environment is complicated, which will lead to substandard construction quality and accidents. Based on this, it is necessary to continuously analyze and study the steel structure technology of civil engineering, find out the root of the problem, and put forward practical countermeasures to solve it.

1. Introduction

With the arrival of the new era, science and technology are constantly updated, which also makes the traditional civil engineering construction no longer suitable for the development of the times. The traditional civil engineering construction mostly adopts brick-concrete or stone-concrete construction technology. During the use of buildings, cracks and settlement will occur to varying degrees, which not only reduces the aesthetic value of buildings, but also seriously affects the quality of the whole construction project [1]. Compared with traditional concrete structures, steel structure technology is now widely used in most construction projects. Steel structure has the same advantages as steel bar in compressive strength. After combination, steel structure is more compressive and tough [2]. In order to ensure that the project reaches a higher technical level, the rigid structure should be analyzed according to the actual situation and the characteristics of the project. Civil engineering construction has played an important role in China's economic development. In the process of modern social development, if the traditional concrete construction method is still adopted, the structural stability will be affected. Based on this, it is necessary to continuously analyze and study the steel structure technology of civil engineering, find out the root of the problem, and put forward practical countermeasures to solve it.

2. Advantages of Steel Structure Technology

2.1. Safety

Due to the particularity of civil engineering, it needs to bear great pressure, so only by improving its compressive capacity and strength can the occurrence of safety accidents be effectively avoided. Because steel structure is a steel structure composed of different types of steel bars, it has the performance of steel bars on the whole. The steel bar itself has very good toughness, so its compression resistance is especially good. At the same time, the component performance of steel structure also determines the choice of materials in the project. In civil engineering, steel structure is more widely used than reinforced concrete [3]. Steel structure technology using steel bar as main raw material has strong compression resistance, which makes buildings framed by steel structure technology more stable on the whole. Steel structure and steel bar will not pollute the environment,

  DOI: 10.25236/civeb.2020.013

and can be reused, saving resources to a certain extent, with good environmental protection. Not only that, the cost of steel structure is also very low, and it can be used many times, which can further control the energy consumption and better promote the sustainable development of our country [4].

2.2. Crushing resistance

In the process of construction, steel structures are used for a relatively short period of time, often in an assembly line production mode, which determines their large scale. It is also because the steel bar has good toughness, so it has good compressive strength. Therefore, the adoption of steel structure technology in civil engineering construction can improve the overall structural performance of the building. Due to the good ductility and compression resistance of steel bars, the compression resistance can also be significantly improved after the steel structure is manufactured. With the application of the structure, not only can the stability of civil engineering be effectively enhanced, but also the engineering life can be prolonged [5]; Then in civil engineering, steel mesh is used as reinforcement structure, which improves the structural performance of the building, has strong pressure resistance, and has strong defense function against natural disasters such as earthquakes.

2.3. Economy

The rigidity of steel structure determines the probability of vibration and deformation of the structure after use, while the rigidity of rigid structure is much better than that of reinforced concrete. In addition, compared with traditional structures such as concrete, steel structure also has the advantages of light weight and high construction accuracy. Due to the smaller component interface, under the same frame, the amount of steel is relatively small, saving the concrete weight of beams and columns. Steel structure can avoid some problems in concrete construction, is more economical than brick-concrete structure, saves concrete and other raw materials, reduces the construction cost of the project, and has higher economy [6]. Using steel structure as the main material is simpler in structure, which is also conducive to saving costs and fundamentally improving the competitiveness of construction units.

3. Problems Existing in Current Steel Structure Technology

3.1. High complexity

Steel structures may undergo corresponding changes according to the gradual changes of external temperature, humidity and other objective conditions. To a certain extent, it affects the construction technology and construction quality. Some of the more difficult construction buildings require external professional and technical personnel to complete. If the fire resistance of steel structure is relatively weak, the strength and toughness of steel structure will weaken when the temperature inside or outside the building rises. In case of large-scale fire, steel structure will also face the risk of collapse. The stability of the steel structure will not be affected. However, if the ambient temperature of the structure exceeds this limit, the comprehensive properties of the steel will change. If the temperature exceeds 600 degrees Celsius, the steel structure will be severely deformed [7]. Therefore, the stability of the completed building structure is poor. Or the construction drawings have not been carefully reviewed and the maximum strength that each structure can bear has not been calculated, which makes it difficult to ensure the construction quality of civil engineering. Cement is used as the main building material, and most of them are steel structures at present. However, many construction personnel do not know much about steel structures, which leads to some defects in the construction methods adopted, thus increasing the probability of construction safety accidents.

3.2. Increase construction cost

Steel structures can easily withstand 20% strain and exhibit strain ductility close to 100[8]. Although steel has high strain ductility, the curvature ductility of flexural members is usually

insufficient due to the unstable stress. Objective if that steel structure is not operate in accordance with the specified requirement during the construction of the project, once a construction safety accident is caused, the construction progress of the whole project will be greatly affect [9]. If inferior steel is used in civil engineering construction, it will damage the overall construction quality of civil engineering structures. The specification of steel structure technology in practical application is not perfect. For example, when designing a steel structure, inaccurate evaluation of the quantity of steel materials used may lead to high utilization rate of steel bars during construction and waste of steel materials. In the process of civil engineering construction, the construction party is not scientific and reasonable, and the environment is complicated, which will lead to substandard construction quality and accidents. However, in recent years, construction accidents have occurred frequently, resulting in numerous casualties and adverse effects on the whole construction project.

4. Analysis on Technical Points of Steel Structure in Civil Engineering Construction

4.1. Strengthen construction preparation work

The application of steel structure in civil engineering construction requires careful selection of steel by construction personnel and management personnel. According to the actual needs of the current project construction, steel should be scientifically selected. The engineering construction drawings need to be designed reasonably, and must be strictly examined. They can only be put into use after being modified and improved according to the opinions of on-site construction operators and supervisors. In the construction of steel structure, tower crane equipment has great advantages, can be suitable for lifting with different strength and weight, and can greatly reduce the construction cost. When connecting beam-column and beam-beam, high-strength bolt connection and welding are often used. If the method of high-strength bolt connection is adopted, the inspection shall be carried out first to ensure the accuracy of the connection holes. System management plays a normative role. It can set up management objectives in construction and provide corresponding management systems in each steel structure engineering link to maintain the smooth progress of steel structure design and construction.

4.2. Paint technology for steel structure

As steel structure has the disadvantage of weak corrosion resistance, for steel structure welding work, after it is completed, preventive measures should be actively and effectively taken to avoid the corrosion of steel materials and further ensure the key performance of the steel structure itself. After the antirust paint is dried, use tools to scrape the defects on the surface of the structure. When painting the surface, brush more and manage more to ensure good appearance, no oil flowing and falling, full color and even color. Therefore, the design should be based on the local climate as a standard. However, research shows that compared with high carbon steel composition steel, low carbon mud has the effect of improving toughness. In addition, the person in charge of civil engineering shall purchase the required components and prepare the relevant construction materials and construction monitoring equipment before the steel structure required for construction is used. The steel structure shall be cleaned regularly. During the maintenance work, the steel structure shall be prevented from being hung, which is not conducive to corrosive cleaning agents. For the equipment with damage phenomenon, replace it in time and brush it with nano paint to inhibit erosion.

4.3. Hoisting construction

In the construction of civil engineering, machinery is essential and can increase the economic benefits of the building. Therefore, before construction of civil engineering projects, all construction personnel should make detailed plans and strictly check the installation area of hoisting structures and the specific hoisting construction process. Such as expansion and contraction, lifting weight and other indicators to ensure that it is sufficient to complete the lifting of steel structures in civil engineering construction. Although mistakes in the operation of steel structure technology are

inevitable, in actual construction, a comprehensive and strict examination of the design drawings used and tracking of their progress play an important role in improving the feasibility of technical operation. When installing the steel structure, it is necessary to operate with the aid of a crane to ensure a long enough arm and lifting capacity. The strength and length of wire rope should also meet the requirements. The quality of steel structure construction is directly related to the lack of site management. Due to the lack of site supervision, problems in steel structure construction cannot be pointed out in time, leaving many hidden dangers. In the actual civil engineering construction, it is necessary for the construction personnel to fully understand the internal and external environment of the building in combination with the construction design and engineering planning, so as to ensure the reasonable use of hoisting technology, thus bringing certain benefits to the civil engineering construction.

4.4. Supervision of technical construction of steel structure

In the construction of civil engineering, it is not only necessary to ensure the quality of the project, but also more important to ensure the safety of the construction. Safe construction is the basic guarantee for the smooth progress of the project. Before installing the steel structure, the construction personnel of the project shall clearly specify the materials, specifications and sizes of the welded joints of the structure, preferably the welding work between the beam and column, beam and beam, etc. The establishment of a perfect supervision mechanism is also conducive to the orderly management of the whole project construction. The perfect supervision mechanism enables timely supervision of the situation and effective post-treatment when accidents occur. Not only that, in the actual construction process of civil engineering, it is also necessary to strengthen the safety supervision and management of engineering construction, and to severely punish violations, so as to enable employees to establish awareness of the importance of safe construction. In actual construction, the intensity of safety supervision should be strengthened and some illegal construction should be stopped in time. In the construction personnel, but also strict requirements and management, enter the construction site, should wear a helmet. For example, after a period of time, check all construction projects, the number of monthly checks should exceed 2, and after the completion of the project, the technical personnel, construction personnel, construction project quality, etc. should be strictly examined.

4.5. Reasonable material selection and standardized welding

As the steel structure is formed by connecting a plurality of steel bars with different sizes, welding technology is required for connection. Therefore, in the process of construction, the quantity of steel structure is relatively large and the quality requirements are relatively high. At present, in civil engineering construction, the section of steel structure is mainly box section and I-shaped section, and cross section is also very common. Technicians need to review the steel performance parameters to avoid damage to the engineering construction quality caused by material selection errors. Three vertical welding, welding the upper beam frame first, then pressing plate bracket, lower frame beam, pressing plate bracket, middle frame beam and pressing plate bracket. Technicians need to review the steel performance parameters to avoid damage to the engineering construction quality caused by material selection errors. Welding technology can have the most direct impact on the progress and quality of the whole project. Therefore, this requires the welding technology not only to meet the needs of the whole project in terms of progress, but also to meet the needs of the whole project in terms of quality. For example, a sleeper meeting the requirements is installed to support the corresponding operating equipment components and ensure that each component is dry and clean during construction, so as to prolong the application period of steel structure in civil engineering. Before welding, use gas welding or special baking gun to evenly heat the groove and the base metal within 100mm on both sides, and use surface thermometers to measure the temperature to prevent the temperature from not meeting the requirements or surface local oxidation and preheat the temperature. At the same time, to do a good job in the daily maintenance of the equipment, the mechanical equipment added with lubricating oil should be added in time. Ensure stable equipment performance, thus better meeting the requirements of steel

structure anticorrosion construction.

5. Conclusion

To sum up, compared with the traditional concrete construction technology, the application of steel structure technology in civil engineering construction has multiple advantages. Steel structure has become a common structural type in civil engineering buildings. It has the characteristics of high safety, good compression resistance and high cost performance. In the process of civil engineering construction, it is necessary to strictly control the engineering quality, improve the application efficiency of steel structure technology in civil engineering construction, and ensure the stability and safety of civil engineering building structures. It not only improves the construction quality of construction projects, but also ensures lower material costs, thus ushering in new opportunities for the development of the construction industry. In the process of construction and installation of some steel structure projects, attention must be paid from material selection to material stacking, painting, welding, installation and other aspects, so as to effectively improve the quality of steel structure, provide reliable guarantee for construction projects, and make great contributions to promote the overall development of China's construction industry.

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