A Brief Analysis of Green Construction of Prefabricated Building Based on Guide Frame Climbing Lifting Platform

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Abstract. With the development of the construction industry and the vigorous support of national policies, prefab building has become the trend of future development of construction industry, which also makes the use of mechanical equipment in construction gradually enriched. Among them, the guide frame climbing lifting platform belongs to the building elevation construction equipment, which is more efficient in the construction process of prefabricated building. Its main characteristic is to reduce the construction personnel's allocation, and the construction personnel's burden, to ensure the quality and efficiency of construction, and to ensure that the safety of construction personnel played a huge role. It has played a great role in ensuring the safety of construction personnel and so on.

1. Introduction

Foreword: In prefabricated building construction, traditional scaffolding is generally used, but this form of construction work has some drawbacks. Construction units need to face up to the drawbacks and continue to improve. In the process of continuous improvement of building construction requirements, construction technology should also be constantly developed, so as to meet the requirements of architecture. The current construction technology is not perfect, but the use of guide frame climbing lifting platform can ensure the quality of construction, so it has been widely concerned. But there are also many issues that should be addressed in the use of this equipment so that it can play a greater role in improving the technology.

2. Classification and features of guide frame climbing lifting platform

Building construction is a complicated process, especially with the increasing demand of high-rise buildings, constructors need to conduct construction by virtue of construction equipment, and the quality and function of construction equipment directly affect the quality of construction. Guide frame climbing lifting work platform can meet the requirements of constructors. In addition to being easy to construct on high ground, this equipment is used in many other fields.

2.1. Classification of guide frame climbing lifting platform

2.1.1. Single column and double column guide frame climbing lifting platform. This classification method is mainly divided based on the number of guide column. In the actual construction process, single column or double column can be selected according to the length of the building. Double column is characterized by greater stability and the ability to erect longer working platforms on them. So the double column features more prominent, it can effectively save costs and improve overall work efficiency. In the construction process, it should be noted that the length of single-column working
platform is about 2.6-10.2m, and the length of double-column working platform is about 8.2 - 23.2m[1]. The single-column construction lifting platform is shown in Figure 1.

![Figure 1 Single-pillar construction lifting platform](image)

2.1.2. **Fixed attached wall and mobile attached wall guide frame climbing lifting platform.** This classification method is based on the position of the attached wall attachment device of the working platform. The base of the fixed attached wall is fixed to the ground and the attached wall device is set outside the building. The features of the attached wall device are quite obvious, and the builders can choose different working layers in accordance with their own needs. The lifting platform attached to the wall can change the position of the climbing frame of the mobile attached wall to complete the climbing, which is convenient for the builders to operate and can save the vertical standard section steel.

2.1.3. **Climbing platform of mast type rack and pinion.** The appearance of the product is shown in Figure 2. The equipment adopts gear and rack transmission, which is the same as the transmission principle of the construction elevator. The length and width of the platform can be customized according to user requirements. The construction lifting platform has the following characteristics: easy installation and disassembly, easy to change the construction position, convenient transportation; the platform can be combined and changed, and can be used in combination, which can meet the conditions of the building's outer surface being flat, curved surface, etc.; stable operation and high efficiency, Large carrying capacity.
2.2. The technical features of guide frame climbing lifting platform and feasibility analysis of its use in prefabricated building

- Through the use of guide frame climbing lifting platform, it can be found that its safety is higher, it can mainly ensure the stability of the platform, and ensure the construction safety of the builders.
- The height and length of the guide frame climbing elevating work platform can be adjusted freely, so it can meet different construction needs, and builders can adjust their postures according to their own needs, greatly reducing the burden of staff.
- The guide frame climbing lifting platform is equipped with safety protection facilities, such as automatic screen jumping control, automatic height limit stroke control, etc., which guarantees the construction safety.
- It can enhance the efficiency of construction, mainly because of its high degree of automation, and very easy to operate.
- Compared with traditional aerial work facilities, it uses fewer materials, which can reduce construction costs, and is more efficient and safer during use [2].

3. Application of guide frame climbing lifting platform in prefabricated building construction

Prefabricated building refers to the building that uses prefabricated components and is assembled on site. Its design, production, construction and management process are highly standardized, according with the elements of green construction, so it has been vigorously promoted and supported by the state. With the implementation of prefabricated green construction, the traditional scaffold is increasingly out of line of the construction requests, so the application of the guide frame climbing lifting platform, not only can conform to the requirements of green construction, but also can play a full role in prefabricated building.

At present, many construction enterprises in our country have used the guide frame climbing lifting platform, and there are also enterprises producing this equipment. However, at this stage, the scope of use of this device is still relatively small, it has not been effectively promoted. To solve this problem, it is necessary to analyze the device itself.

3.1. Green construction features of prefabricated buildings

Prefabricated building construction is quite special, which is obviously different from traditional building construction. First, its construction is quiet. Second, its construction covers a small area, and
has the characteristics of protecting the environment and saving resources. In prefabricated construction, only the foundation is treated at the construction site, and then the work such as assembly can be carried out. Its main advantages are high construction efficiency and low labor intensity. In general, the assembly of components in the field is faster, which can reduce the number of on-site staff, can ensure the efficiency, mechanization and standardization of the building.

At present, traditional scaffolding is still used in the construction of the structural facade of prefabricated buildings, which has slowed construction to a certain extent and slowed the development of prefabricated buildings.

3.2. Application of guide frame climbing lifting platform in prefabricated building

- Coordination of lifting of prefabricated components. First, it can serve as a tool-based protection system. It is of great significance to take the guide frame climbing lifting platform as a kind of protection system, which is mainly reflected in that it can adjust the structure at any time during the construction. Furthermore, it ensures the efficiency of construction, and it can be changed in time according to the requirements of construction, so the application of movable enclosures for fixed pins and scaffold in prefabricated building structures currently in use can be eliminated. Second, it can assist PC component positioning. Before the installation of prefabricated panels, positioning, measurement and other works should be carried out first, and the utilization of guide frame climbing lifting platform can enable staff to quickly complete the installation and testing work, which can effectively enhance the positioning precision of components. Third, it assists PC component measurement. The use of the guide frame climbing lifting platform can meet the requests of the fabricated structure for the height and flatness of the components completed by hoisting, thus effectively ensuring the accuracy of the measurement inside and outside the PC wall and decreasing the errors in component installation. Fourth, it reduces the non-standard operation. The use of the guide frame climbing lifting platform can ensure the normativity of the operation, especially in the current many prefabricated buildings, there are irregularities in the fixing and correction of operations. Therefore, in order to reduce these problems and ensure the safety of construction, the guide frame climbing lifting platform can be used to make sure the smooth development of construction [3].

- Coordination of facade construction of prefabricated buildings. In the actual construction environment, the characteristics of prefabricated buildings need to be considered, especially in the complex construction of the facade of prefabricated building, as the construction steps and procedures are directly related to the construction quality, constructors are required to maintain a rigorous construction attitude, with the aid of mechanical equipment to complete the construction of each procedure. In the traditional construction, the use of scaffolding and hanging basket is not safe, but the use of guide frame climbing lifting platform has a certain advantage, it is not only safe, but also to ensure the quality of construction. The operators above or below can work at the same time without interfering with each other, thus improving the efficiency of the work.

In Chengdu Greenfield 468 Project, a hybrid prefabricated structure with giant outboard frame with overhanging arms, and guide frame climbing lifting platform fixed attached wall and mobile attached wall guide frame climbing lifting platform are adopted. During the construction process, these devices not only make the external wall of the core tube of the project shrink 3m inward, but also solve the problem of the height of the traditional scaffold, which improved the assembly speed, coinciding with the characteristics of green construction.

4. Conclusion

With the constant development of construction mechanical equipment, the disadvantages of traditional construction methods are gradually prominent, so people need to choose more convenient and safer construction facilities, which is not only to guarantee the construction safety, but also to improve the
construction quality. The development of prefabricated building has been extensively concerned by people, and this construction method will be popularized in a wider range in the future. The use of guide frame climbing lifting platform in prefabricated building construction can effectively ensure construction efficiency and quality, so it will gradually arouse the attention of construction enterprises gradually.

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