

Analysis of Quality Problems in Assembling Construction

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Abstract

At present, our country is rapidly transitioning towards a new stage of industrialization and urbanization. Under the background of the new normal of the economy and strong support from national policies, the construction industry is inevitably undergoing a new round of reform, transformation, and upgrading from traditional handicrafts to modern industrialization. The original economy and industrial structure will inevitably face continuous upgrading and changes in the new form of economic development. In this context, innovation, coordination, green, openness, and sharing have gradually become new development requirements for China's construction industry. Therefore, prefabricated buildings that are efficient, cost-effective, incremental with quality assurance, green and environmentally friendly, and can promote product upgrading and technological innovation in related industries are gradually replacing existing cast-in-place buildings, becoming an inevitable trend in the development of China's construction industry. Due to the practical application of prefabricated construction technology in the construction process, it involves the production, transportation, lifting, and assembly of various prefabricated components. Especially in various aspects such as ALC panel wall construction and prefabricated composite plate installation construction, construction enterprises need to analyze and summarize common quality problems during the construction process, develop scientific and reasonable solutions, in order to continuously improve the construction technology and promote the healthy and sustainable development of the construction industry while ensuring the stability of quality. The article mainly summarizes, analyzes, and explores the common quality problems and countermeasures in prefabricated building construction.

Keywords

Fabricated Buildings; Construction Quality; Technical Points; Management Measures Method.

1. Introduction

Most of the traditional residential structure system is reinforced concrete structure, which is mostly for site operation, with many characteristics such as long construction cycle, limited building height, difficult to control engineering quality and large labor demand [1]. The prefabricated steel structure has the advantages of green environmental protection, lightweight, modularization, easy disassembly and recycling, less manpower input, part of the work can be completed in the factory, less impact on the environment, can adapt to high-rise or super high-rise buildings, short construction cycle, compared with the traditional building model [2]. In 2022, the Ministry of Housing and Urban-Rural Development issued a notice on the 14th Five-Year Plan for the Construction industry, which mentioned the vigorous development of prefabricated buildings. Build a standardized design and production system of prefabricated buildings, promote the intelligent upgrading of production and construction, expand the use scale of standardized components and parts, vigorously promote the

application of prefabricated buildings, and actively promote the construction of high-quality prefabricated steel structure housing [3]. With the continuous development of hardware and software equipment in the engineering technology industry, the application of various innovative design concepts and construction technologies in construction engineering is more and more abundant. Especially, the application of prefabricated buildings is at the forefront. This construction mode has been applied in foreign countries for many years. How to promote the localization of this advanced technology in China, and maximize the construction quality, has become the difficulty and focus of its application [4]. The focus of this paper is to control the construction technology of prefabricated buildings from the construction quality problems, so as to provide reference for high-quality construction and ensure the stability and safety of the building.

2. Features of Prefabricated Buildings

The prefabricated concrete building is on the basis of modular design, through the mode of pre-product processing mode, and the products are transported to the construction site to realize the prefabricated construction. In the process of construction, through the use of information management technology to achieve the construction of information [5]. This is mainly reflected in four aspects.

In the process of splitting and stitching the building structure, the analog number can be applied to standardize the design of the building components, thus greatly reducing the cost of the construction process.

After completing the relevant drawing and technical procedures, the pre-product factory directly carries out deep processing in the factory to ensure the accuracy of the products to the maximum extent, and also reduce the pollution of the traditional on-site processing and save the construction cost.

After the prefabricated components arrive at the site, they are directly hoisted through the lifting machinery and stitched together into a whole, which greatly accelerates the processing speed of the site. At the same time, it also reduces the amount of the site, and the environmental load is small. Less site construction personnel, but also improve the human efficiency of the site.

With the help of BIM information tools, the information sharing in the construction process can be realized, ensuring the coordination error caused by the information transmission and communication in the construction process to the maximum extent, and ensuring the accuracy of the site construction.

3. Organization of the Text

The The number of pores and large aperture on the surface are large.

Cause analysis: the use of oil release agent, resulting in the concrete pouring, multi-oil parts are easy to form pores. The mold is not clean. After coating the release agent, the mold surface is easy to form raised parts. After the concrete is poured and hardened, it is easy to form pores. Concrete pouring vibrating method is improper, not dense.

Prevention measures: use water-based release agent or oily release agent instead of oil. Before the release agent, the mold must be cleaned, and the cushion plate should be used in the reinforcement binding and embedding process. It is not allowed to walk on the mold coated with the release agent. The workers for concrete vibration technology disclosure, layered pouring, control the vibration spacing, and the vibration process for standing.

The center line position and buried height of the embedded parts such as the wire box, wire pipe, lifting point, and embedded iron parts in the prefabricated components are too much offset and blocked.

Cause analysis: the embedded parts are not fixed. Concrete vibrating touch the embedded parts, concrete pouring or vibration of the displacement. The embedded bolt for the wall board support is missing, and the buried expansion bolt on site destroys the embedded line pipe.

Prevention and control measures: the bottom of the embedded wire box on the upper surface of the prefabricated member must increase the support to prevent floating or sinking. When the concrete vibrates, it is strictly prohibited to touch the embedded wire box and wire pipe. Bury the support embedded parts in advance, and ask the positioning drawing for the missing parts of the component factory to avoid damage to the embedded pipe.

The vertical position of the stacking pad is not in a straight line, the pad is missing, and the stacking member is not placed horizontally.

Reason analysis: the managers are negligent. Did not pile up according to the construction plan, or failed to disclose to the construction team. The component stacking site is uneven.

Prevention and control measures: select special personnel with a strong sense of responsibility to be responsible for the entry, stacking, lifting and installation of prefabricated components, and strengthen the sense of responsibility of the management team. Before the construction, the special construction plan of prefabricated construction should be prepared, and the construction team should be disclosed to ensure that the vertical pad should be in a straight line. The components should be stacked on a flat and solid site. If the stacking site is uneven, the prefabricated components should be placed smoothly by adjusting the pad.

The prefabricated stair components will be damaged during lifting.

Cause analysis: The command personnel sends out the wrong signal. Improper operation by the tower crane driver.

Prevention and control measures: strengthen the training and assessment of hoisting operators, must pass the training before the post.

The prefabricated stairs are not lifted with a shoulder pole.

Reason analysis: the safety awareness is not strong. Did not lift according to the hoisting scheme.

Prevention and control measures: strengthen professional knowledge training for project management personnel and improve safety management awareness. Study and publicize the construction plan, and carry out the hoisting construction in strict accordance with the construction plan.

Finished product protection is not timely, causing damage to the finished products.

Reason analysis: management consciousness, ideology has not changed. Protection measures for destruction of finished products during subsequent construction.

Prevention and control measures: the prefabricated structures are mostly components with decorative surface or without plastering. Different from the traditional construction methods, the project management personnel should change their ideas and strengthen the awareness of finished product protection. Protection measures for damaged finished products shall be restored in time.

Suracking cracking at the corners of prefabricated members.

Cause analysis: the door and window openings and other corner parts are not set up with reinforcement according to the standard requirements. Not conducting reinforcement according to the design requirements before lifting, transportation and installation. The lifting point position design is not reasonable. Improper production and maintenance.

Prevention and control measures: door and window openings.

4. Literature References

Read relevant materials and combine with the existing prefabricated projects, summarize the construction quality problems that often appear in the construction process of prefabricated buildings, which are classified into raw material problems, problems in the lifting process, and problems caused by the construction technology. In order to prevent the occurrence of these common quality problems, the general prevention and control measures are:

A special construction plan shall be prepared, including the production, transportation, stacking, lifting, connection, acceptance and other aspects of the components. The plan shall be publicized and

implemented to all the management personnel of the project department and the professional construction team after review;

Strengthen the raw material control, establish the concealed acceptance system of the component factory, and retain the image data;

During the first production of components in the factory, organize relevant personnel to the factory for the first piece acceptance; after assembling the first layer on site, organize relevant personnel to conduct the first layer acceptance;

Organize the construction unit, design institute, component manufacturers and construction units to solve the problems found in the joint acceptance of the first component and the first layer structure, so as to avoid similar problems in the subsequent construction;

Organize the joint acceptance of the components, check the number and location of the reserved and embedded components, form written records, and record the size, appearance quality, reinforcement and other conditions of the components in detail;

The components must be lifted after meeting the strength of the design requirements;

The component stacking site shall be solid and flat, the pad should be consistent with the lifting point, and should be in a straight line;

Before the lifting of the component, the professional surveyor will release the position control line of the component to install the component and ensure the first lifting in place;

Carry out key technical review and quality inspection on the cast-in-place nodes and key parts after lifting and placement, and carry out construction simulation in advance to avoid the collision of reserved steel bars;

Project management personnel shall strengthen the process management, carry out various construction in strict accordance with the construction plan, and keep the construction image data for the construction process of important parts such as sleeve grouting.

5. Conclusion

In a word, due to the construction process of prefabricated construction projects, often due to the influence of various internal and external factors, leading to the quality problems of prefabricated construction projects, which affect the sustainable development of the construction industry. So, the construction industry in the process of prefabricated construction construction, must further analysis and research the quality problems existing in the prefabricated construction, formulate scientific and reasonable solutions, using the perfect construction technology to optimize the performance of prefabricated construction, at the same time strengthen the training of professional skills, standardize the prefabricated construction of engineering construction process, to effectively improve the prefabricated construction engineering construction quality, promote the development of the construction industry.

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