

The Influence Factors and Control Strategies of Prefabricated Building Cost

Kaichen Zhang

*School of Computer Science and Information Engineering, Bengbu University, Anhui, Bengbu, 233030, China
2285440413@qq.com*

Abstract: *At present, China is continuously pushing the development of prefabricated construction buildings, and project costs of which will directly affect its popularity and utilization. But to serve the needs for sustainable construction of the economy in China, the substantive construction of prefabricated buildings will become the general trend of the development of the whole industry. Starting from the realistic condition of prefabricated construction, the paper conducts systematic analysis by comparing the prefabricated construction and traditional architecture cost and reasonably analyzing the main influence factors of prefabricated construction cost, and according to the actual situation of a certain community in Shenyang, extracts specific management strategy, and conducts cost management for prefabricated construction.*

Keywords: *Prefabricated Building Cost; Influence Factors; Control Strategy*

1. Introduction

Precast prefabricated houses are actually the houses made of prefabricated components of engineering products assembled on the site, which have rather quick construction efficiency, better effect to reasonably save labor and improve construction efficiency, with relatively less interference of the weather conditions. At present, the main goal of scientific research is to rationally conduct the research into improving the construction efficiency and economic effect, then reduce the construction cost of prefabricated houses. Now, the production cost of prefabricated construction in China is higher and even more than 30 percent in some places, compared with the traditional cast-in-situ concrete construction. At what level does prefabricated construction cost increase? Next, the research on the influence factors around the production cost of prefabricated construction will be conducted.

2. The Reasons for High Project Costs of Prefabricated Building

2.1. Exorbitant Cost of PC Components

Due to the complex processing, assembly, construction and other matters of PC components in the prefabricated building, the construction costs have also risen to a large extent. In accordance with the recently relevant evaluation index inside China, it is indicated that the PC proportion of precast prefabricated buildings has increased from the previous twenty-one percent to fifty-two percent above, and the prefabricated building cost has also raised over fifteen percent compared with the traditional building expense. That is to show that the price of PC structures has a considerable influence on prefabricated building cost. However, the main reason for this phenomenon is mainly the precast prefabricated building was still in the initial state at that time, and the rules and regulations of the relevant market were also not perfect, so generating the product price of PC structures provided by manufacturers was much higher than the price of traditional cast-in-place concrete ^[1].

2.2. Too Small Scale of Prefabricated Building Projects

Because prefabricated houses are still at an earlier evolutionary stage, with smaller capacity. For example, for manufacturing enterprises specializing in manufacturing PC components, the corresponding processing charges are also divided into two kinds, one of which is mainly fixed investment expenditure on facilities, places and other investments, and other manufacturing expenses

or supplies expenses are used to change the cost of production. According to this opinion, the production cost of precast prefabricated buildings to a greater degree is because of the higher price of machining and fixing, and if the late precast prefabricated building will be relatively larger in development scale, the manufacturer or the Chamber of Commerce can also increase the size of the products, and the fixed price requesting processing also reduce a lot, so as to reasonably reduce the production cost of precast prefabricated buildings ^[2].

2.3. Less Manufacturers to Precast PC Components and Farther Haul Distance

For the moment, the manufacturers of PC components are few, coupled with the distance of transporting being really distant, causing the corresponding increase in the expenses of shipment and delivery cost. Moreover, it is generally necessary to add a part of the reinforcing, broadening and other costs of technology in transit because the volume and proportion of components are quite large.

3. The Status Quo of Prefabricated Buildings

Now the development of prefabricated buildings in China enjoys sound momentum, which is valued by relevant units in many architecture industries. But because now in China, many levels of prefabricated buildings have not yet established a perfect quality management system, most businesses are hesitant when selecting traditional pouring construction and prefabricated buildings, so paying special attention to the construction cost of prefabricated buildings. As the key point of industrialization development in engineering, China's prefabricated construction market has seen explosive growth. Under the influence of development planning and investment encouragement policies of the national fabricated construction, each province in China has emerged an upsurge in developing construction market of fabricated construction ^[3].

4. Comparison the Cost of Prefabricated buildings and Traditional Architecture

4.1. Material Costs

In the cost of building materials, the traditional cast-in-place project carries out the form of quota calculation conforming to the place where the building is, and designs engineering quantity according to the specific construction drawings, first extracting budget quota, and then collecting fees provided the standard by the local government, with cost charge including direct and indirect construction costs, taxes, etc.

4.2. Installation Costs

The total cost fees of prefabricated buildings, in addition to the traditional cast-in-place building, have the same direct construction costs, and also increased PC components of construction in manufacturing, transporting and site layout and a series of costs. Management cost and profit distribution are both calculated and got according to the actual situation by the businesses after adjustment, and the installation charge of construction costs in prefabricated buildings is composed of vertical transportation, assembly and template cost.

5. Budget Control Measures on Project Cost of Prefabricated Building

5.1. Analysis and Design of Blueprint

Cost and technical personnel for the design of prefabricated construction blueprints conduct all-round study. The content body contains the overall plan and specific explanation for drawings design in the engineering design drawing, including cross-section diagram, elevation and plan etc., so that a more comprehensive grasp of the connotation of engineering design drawings, at the same time make adjustment measures inconsistent with the content of the construction drawings ^[4].

5.2. Ensuring Reasonable Construction Scheme

Scientific and reasonable construction methods can not only improve the progress of construction

projects, ensure quality, but also reasonably reduce the cost of construction projects. The construction method on the main component of fabricated construction and the order of hoisting method on the site construction of PC component both determine the good or bad construction project cost. Cost engineering and technical personnel should also complete collection of engineering statistics, and conduct site investigation of the specific conditions and the basic equipment of the construction site for the process of construction, and analyze the design and construction scheme to enhance scientization and accuracy of the budget compiling work on prefabricated construction project cost, building certain scientific foundations for rationally formulate the construction charge. For example: in the stage of on-site construction and installation, due to the lack of common unified technical standards for the same construction process and process methods, as well as various construction hoisting teams and various site requirements, the price difference is very large.

5.3. Compiling Well the Bill of Quantities

(1) Improving the accounting norm is to realize the specific calculation basis of engineering quantity. The calculation system of the bill of quantities of ordinary cast-in-situ construction method has been relatively perfect, and the specific items of each part in design are relatively clear. However, in allusion to the construction of prefabricated construction method, the construction procedure, technology and quality standards are still in the stage of discussion, research and development as well as innovation, so the specific items of the bill of quantities cannot be fully defined. Therefore, the main construction documents, technical standards and specifications, project quality requirements, as well as new processes and technologies in the specific applications of calculation and measurement, need to be explained in the instruction of the bill of quantities.

(2) The item descriptions listed are complete and correct, and no items are omitted. In terms of project details, prefabricated construction is more than traditional construction, including sleeve grouting materials, filleting pouring, gluing, post pouring concrete pouring and tamping, but there are not only many such items, but also the construction drawings can not fully reflect them and can not be listed in the total bill of quantities, so it is easy to miss items. In the measure-typed construction project, like the on-site reinforcement of building component accumulation, is generally not calculated in traditional construction. In the fabricated construction, due to the overlarge structural volume causing the high requirements for on-site reinforcement, the cost must be included, and the construction drawings can not reflect the situation and are easily omitted.

5.4. Control over the Price of Construction Materials

The main contents of the cost of all projects in prefabricated buildings is to anticipate PC components, parts and other components, so these two parts of materials must be regarded as the main objects of market economy inquiry and order. With the production and development of the current construction, the mass generation of various new material parts enlarges the difficulties in predicting the price of the engineering project and market economy inquiry of the compilation units. Therefore, the compilation units must establish a market economy inquiry group to carry out market economy inquiry specifically for the real value of engineering prefabricated component materials and relevant parts that have not been published by some national cost authorities. Because prefabricated buildings generally have to go through the second deepening design, we can implement short-lived prices for some engineering project materials according to the actual situation while formulating the bidding bill of quantities of construction projects and controlling costs. However, the bidding documents also stipulate that more specific provisions must be made for the confirmation prescription of the interim price, and stipulate that the interim price shall be determined after the bidding parties jointly make an inquiry in the trading market.

6. Cost Control Strategy of Prefabricated Construction Engineering

6.1. Improving Corresponding Policies and Standards

At present, the state has no unified and reasonable legislation on prefabricated buildings to regulate the development of corresponding industries. In general, the total cost of prefabricated buildings is affected by the region. But because the construction cost and other construction materials in various places are different, that causes the production of PC structure manufacturers must be carried out in accordance with certain policies and specifications, which will increase the cost of the structure to a

certain extent, so the total cost of the building will accordingly increase. So, relatively perfect production specification must be formed on the basis of the policies and specifications required by the construction project cost, so as to further perfect the corresponding production policies and specifications.

6.2. Reasonable Layout of Prefabricated Building Industrialization Base

Because the transportation cost of PC structure prepared in advance will directly affect the construction cost of prefabricated buildings, a rational layout for manufacturing sites of the structure is needed and keeps the distance between the construction site and the industrial manufacturing locations of the structure as short as possible. The construction of industrialization base can effectively drive the supporting facilities of corresponding industries, at the same time exert the effect of resource concentration, and reduce the cost of engineering construction by reasonably decreasing the transportation distance of PC components.

7. Conclusion

To sum up, with the development of modern society and the improvement of the public's living levels, prefabricated construction buildings have also emerged and played a positive role in specific projects. In modern construction, because the traditional cast-in-situ method has been gradually reduced, more and more units choose fabricated construction to build high-rise buildings. However, from the comparison of the two costs, it can be seen that the production cost of prefabricated construction is still very expensive, so it is very necessary to study the effective control of the production cost of prefabricated construction. Therefore, by studying various factors restricting the production cost of prefabricated installation and construction, in order to provide guidance on reasonably selecting PC manufacturing businesses, improving the technical level of prefabricated construction, conforming to the construction schedule planning, reducing the adjustment cost, changing the organization and transportation modes, and reducing the material trucking expenses so as to manage the production cost, and hope to lay a reference for controlling the effective production cost of constructing the future prefabricated construction.

References

- [1] Chen Xing. *Influence Factors on Construction Cost of Building Engineering and Cost Control Strategy* [J]. *Technology and Design on Building Engineering*, 2016 (8): 2372-2372
- [2] Xue Ruichun. *Discussion on the Main Influence Factors and Cost Control Strategies of Construction Cost Control* [J]. *China Real Estate Industry*, 2016 (20): 210
- [3] Gu Ming. *Discussion on the Influence Factors and Control Strategies of Electromechanical Installation Cost in Building Construction* [J]. *China Standardization*, 2016 (24): 91
- [4] Zeng Xiangzhou. *Influence Factors and Control Strategies of Project Cost Management in Construction Enterprises* [J]. *Enterprise Reformation and Management*, 2018 (8): 186191