

Panoramic analysis of prefabricated building

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Abstract. Since the 21st century, China's economy has been developing rapidly. China puts forward that by 2050, a socialist modernization country will be built in an all-round way. Under this background, the development of the construction industry has become a top priority. With the improvement of industrial standards of construction enterprises, the implementation of new national policies and the development needs of the construction industry itself, the requirements for construction technology are more stringent than ever. In the face of such a situation, prefabricated construction technology undoubtedly conforms to the development of the current era. Compared with traditional construction technology, the environmental protection, cost reduction and high-tech requirements of prefabricated buildings are also in line with the national requirements for sustainable development policies and the adaptation of construction technology to modern development.

Keywords: Prefabricated, assembled construction, sustainable development.

1. Introduction

With the development and progress of society, our country has a major technological breakthrough. With the application of science and technology in the construction industry, China's construction level is also improving. There is a great difference between traditional architecture and prefabricated architecture in terms of construction concept and structure. This paper aims to make a panoramic analysis of prefabricated buildings, reasonably conform to the development of the times, and explore the direction for the realization of modern industrialization in the construction industry.

2. Development Status of Prefabricated Buildings

Prefabricated building is a structure system, external maintenance system, equipment and pipeline system, internal device system mainly adopts prefabricated components, prefabricated in the factory and assembled in the field. It mainly includes steel structure, prefabricated concrete structure and modern wood structure.

Compared with the traditional buildings built on site, the construction efficiency can be greatly improved and the construction period can be greatly reduced because a large number of components are produced in industrialized ways in prefabricated plants and assembled on site.

After decades or even hundreds of years, the prefabricated buildings in western developed countries have developed to a relatively mature and perfect stage. Japan, the United States, Australia, France, Sweden and Denmark are the most typical countries. Japan is the first country to mass produce houses in factories. The United States pays attention to the comfort, diversity and personalization of houses. France is the earliest country to implement industrial buildings in the world.

Many developed countries with high degree of industrialization in foreign countries have developed various special systems for prefabricated buildings, such as the L-plate system in the UK, the prestressed assembly frame system in France, the prefabricated hollow formwork wall system in Germany, the prefabricated assembly parking system in the United States, and the multi-storey assembled residential system in Japan.

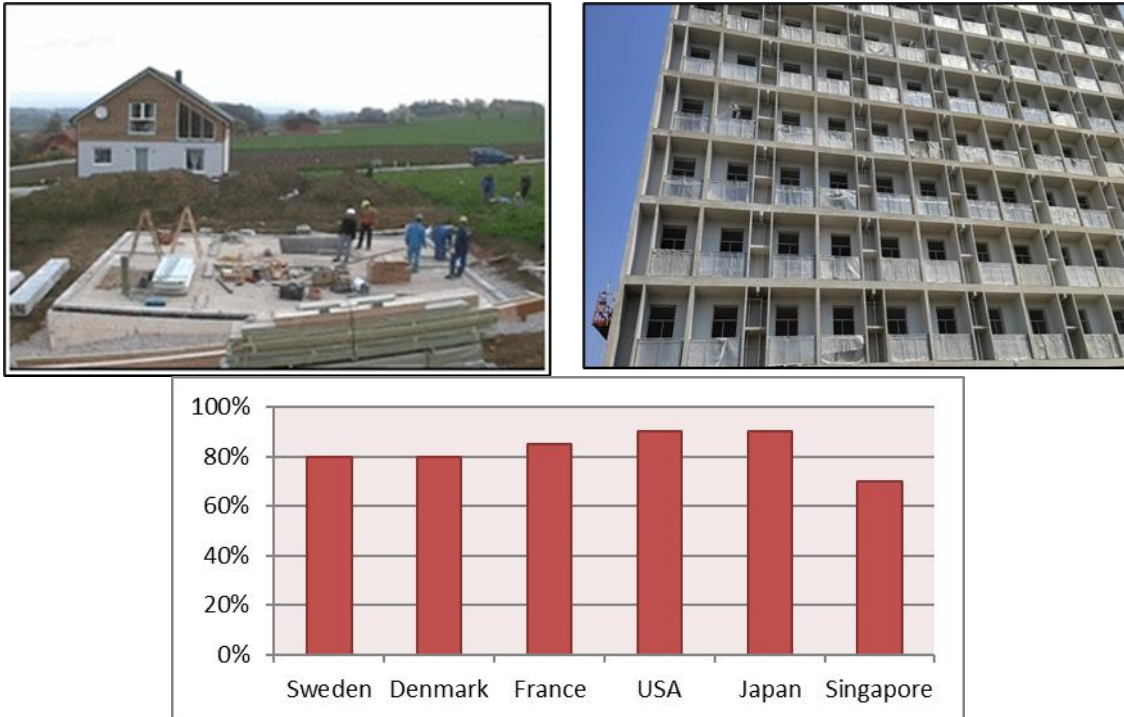


Figure 1. Use of prefabricated buildings in foreign countries

Although China ' s prefabricated construction started late, it has only developed for more than ten years. Since 2013, the industry has entered a stage of rapid development under the impetus of policies. On January 1,2013, the General Office of the State Council forwarded the ' Green Building Action Plan ' of the Development and Reform Commission and the Ministry of Housing and Construction in the form of No. 1 document in 2013 (No. 1 Annex 1 of the National Development Office). The key requirements of the document are to fully understand the green building action plan, and to promote the industrialization of construction as one of the ten important tasks. The CPC Central Committee and the State Council issued ' some opinions of the CPC Central Committee and the State Council on further strengthening the management of urban planning and construction ' (No. 6, 2016). 'Some comments ' point out that it takes about 10 years to make prefabricated buildings account for 30 per cent of new buildings. On September 14, 2016, Premier Li Keqiang chaired the executive meeting of the State Council, decided to vigorously develop prefabricated buildings and promote industrial restructuring and upgrading. The meeting decided to focus on Beijing-Tianjin-Hebei, Yangtze River Delta, Pearl River Delta urban agglomeration and other cities with a permanent population of more than 3 million, to speed up the proportion of prefabricated buildings in the new building area.

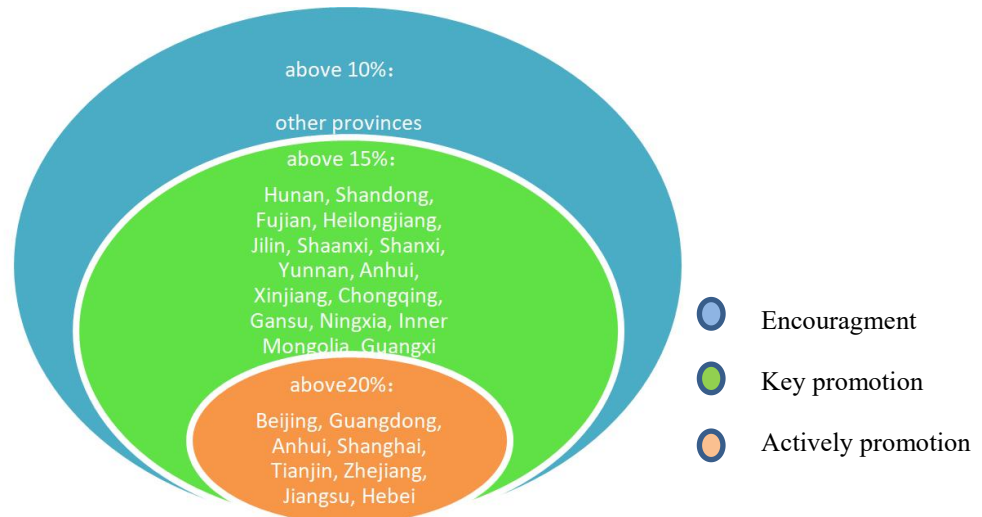


Figure 2. Decomposition of Prefabricated Buildings 2015-2020

3. Basic Characteristics of Prefabricated Buildings

3.1 Standardization of architectural design

Architectural design standardization is the premise of building industrialization. From the beginning of architectural design, the design of buildings and structures follows certain design standards, trying to make buildings and their components modular and standardized. A subsection. The paragraph text follows on from the subsection heading but should not be in italic. When receiving the paper, we assume that the corresponding authors grant us the copyright to use the paper for the book or journal in question. Should authors use tables or figures from other Publications, they must ask the corresponding publishers to grant them the right to publish this material in their paper.

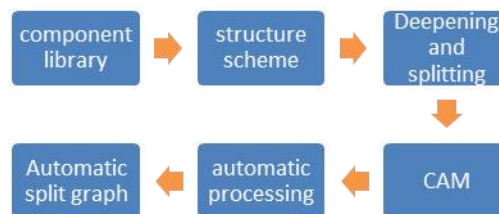


Figure 3. Flow chart for design standardization

3.2 Factory production of structural parts

Factory production of components is a necessary condition for building industrialization. Establish a variety of building components, decorative materials, commercial concrete and other building products and other professional factories, the development of factory production.

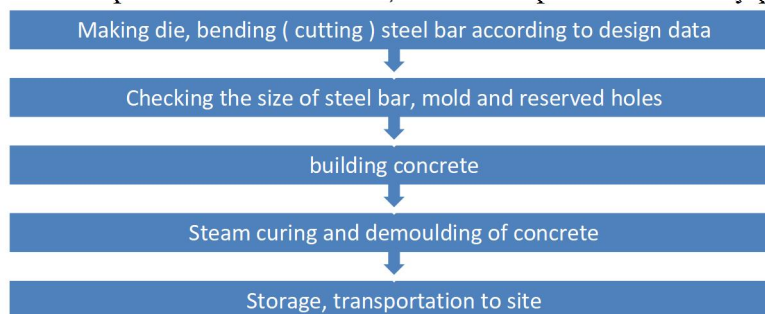


Figure 4. Flow chart for Factory production

3.3 Assembly of construction

Construction assembly is the core of building industrialization. Adopt advanced and applicable technology, technology and equipment to organize construction scientifically and reasonably, develop construction specialization, improve mechanization level, reduce heavy and complex manual labor and wet work.

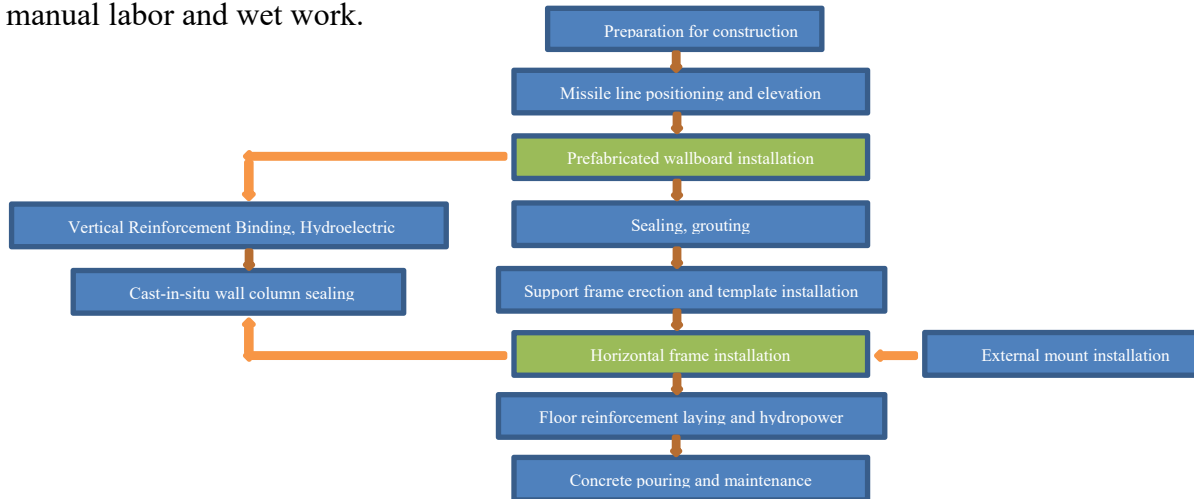


Figure 5. Installation and construction flow chart of prefabricated components in prefabricated buildings

3.4 Decoration integration

Decoration integration is the inevitable trend of building industrialization. Through the whole design, construction, sales tracking, engineering supervision and supervision, cross operation coordination, after-sales service process, the whole decoration process becomes scientific and reasonable. One-stop service makes decoration more economical, time-saving and labor-saving. Factory production and mechanized construction make the decoration site more environmentally friendly and refreshing.

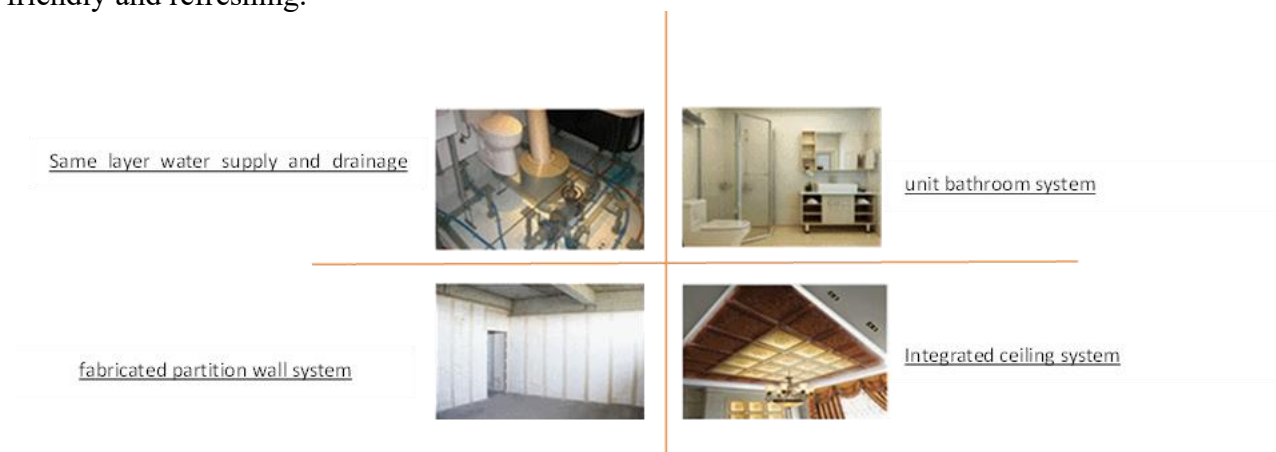


Figure 6. Integrated decoration flow chart

3.5 Management informatization

Management informatization is the inherent requirement of construction industrialization. The application of building information model (BIM) technology in the design, production, transportation, construction, operation and maintenance of prefabricated buildings will help to fully realize the barrier-free communication of project information.

4. Problems to be solved of prefabricated buildings

Prefabricated building structure has the advantages of high quality, short construction period, low energy consumption, resource conservation and low pollution, which has been widely applied in the construction industry in China. However, due to the imperfect management system and the incomplete technical standard system and industry norms, there are still various problems affecting the quality and duration of prefabricated buildings in the construction process. There is still a lot of work and research on prefabricated buildings in China.

4.1 Research on Key Technology of Prefabricated Building Construction

There are still many deficiencies in the construction organization design management system of prefabricated concrete buildings in China, mainly in accordance with the traditional construction technology. In order to promote the progress of prefabricated concrete buildings in China, a sound construction organization design management system suitable for prefabricated concrete buildings needs to be developed.

4.2 Study on Strengthening Module of Prefabricated Building

The specifications of prefabricated building components in China are single and lack of standardized general prefabricated components. Due to the project quantity is not large, it is difficult to form large-scale production, resulting in cost advantage cannot be fully exploited. In order to avoid the problems of single specification and style and poor technical economy of prefabricated concrete building components prefabricated coagulation: the modular research of earth buildings needs to be strengthened.

4.3 Standard and Specification for Prefabricated Buildings

Prefabricated buildings need relevant standards and norms to be vigorously promoted. Due to the lack of practical experience and technical standards of prefabricated buildings in China, many technologies and construction standards are still in the blank stage, which makes the construction personnel have no standard to check, and greatly affects the speed of transformation and upgrading of China 's construction industry. Therefore, the research on prefabricated building technology and the preparation of standards need to be accelerated.

4.4 Need to train professional team of prefabricated construction

At present, the education level of construction workers in China ' s construction industry is not high, and they can only carry out simple traditional construction work, which may not meet the requirements of construction mechanization and industrialization. In order to realize the rapid installation and completion of construction of components in the construction site of prefabricated concrete buildings, attention should be paid to the construction of professional talents with the ability of prefabricated building design, construction and management. 16 Only by strengthening the training of professionals can a mature professional team of prefabricated coagulation : soil construction be cultivated.

4.5 Increase Investment in Courses and Related Scientific Research on Prefabricated Building Design and Construction in Colleges and Universities

Due to the lack of statistical data, it is difficult for universities and research institutes to accurately predict housing demand through mathematical models. It is undeniable that accurate prediction technology plays an extremely important role in promoting the development of prefabricated concrete buildings. In the course teaching of colleges and universities, it is necessary to form the teaching task of prefabricated buildings, and encourage colleges and universities to increase investment in prefabricated building design, construction courses and related scientific research.

5. Acknowledgments

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