Development and Application of Light Steel-Wood Plastic Structure
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Abstract. This paper describes the production process and development status of light steel-wood-plastic structure, and introduces the advantages of light steel-wood plastic environmental protection and energy conservation. This system is still in the initial development stage in China. It is hoped that through the elaboration of this article, more people can understand the advantages of light steel-wood-plastic building structure in China. With the growth of the national economy and the improvement of the living environment, this structure can be promoted in Chinese architecture.

Introduction
At present, the light steel-wood-plastic structure has become the main building structure form in developed countries. In China, the modern light steel house building system was born late and started in the early 20th century. The light steel-wood-plastic structure has become the main building structure form in developed countries. In China, the modern light steel house building system was born late and started in the early 20th century.

Advantages of Light Steel Structure
In the environment of rapid social and economic development, people have put forward higher requirements for the living environment. The light steel structure has the advantages of lighter weight, less steel consumption and shorter construction period than steel structure. This form of residential system is developed on the basis of wooden houses, originated in Europe and the United States, developed in Japan, is a brand new building system. Light steel structure refers to steel structure with thickness less than 10mm. It has been widely used due to its own light weight, low cost, short construction period, good comprehensive economic benefit, good seismic performance, easy disassembly and relocation and environmental protection advantages [1].

In recent years, China has vigorously developed new rural construction. The light steel residential system conforms to the environmental protection policy issued by the state and also applies to the economic requirements of low-rise housing construction in rural areas.

Development and Characteristics of Wood Plastic Materials
As mentioned above, wood as a residential structure originated in Europe and the United States. Due to the enhancement of global environmental awareness, there are fewer and fewer buildings of all-wood structure, and the housing of steel-wood structure system is developing rapidly. Especially in North America, light steel and timber-framed homes are very mature. In Yunnan, China, ethnic minority architecture has become a cultural feature of the region, but with the economic development, some architectural culture is dying, and timber-based buildings are difficult to continue to build. In order to preserve national characteristics and protect forest resource, developed to replace wood. Wood-plastic composite wood-plastic composite materials have been(WPC) is a composite material prepared by melt mixing of thermoplastic resin and biomass fiber and appropriate additives [2]. In fact, it is a high-performance product produced by crushing waste wood, crop straw, etc. into powder, and using it as a raw material together with

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plastics, adding various additives, and processing by hot pressing or melt extrusion. High value-added composite materials. Both the characteristics of wood, the strength of plastic, the ductility of metal, the elasticity of rubber, etc., can prevent corrosion and moisture, and are the product of industrial development.

Development and Application of Light Steel-Wood Plastic

In the mid-1960s, cold-formed thin-walled steel-structured houses began to develop in China, and developed relatively late in developed countries. It was not until the reform and opening up that more than 200 cold-formed thin-walled steel houses in Japan were introduced. In 1986, the Italian steel company worked with the Italian steel company to develop a BSIS system for low-rise light steel residential buildings, and built a two-story light steel residential model house [4]. This kind of light steel structure house is basically transported to China under the condition of foreign design and processing. The Chinese people are only responsible for the basic construction and on-site installation of the structure, and there is almost no actual light steel structure production technology.

However, in recent years, Chinese scholars have the following results in the exploration of the cold-formed thin-walled steel residential system:

In 2008, Guo Peng [5] published the test and theoretical study on the shear resistance of cold-formed steel skeleton wall. Through the theoretical research on the shear performance of the cold-formed steel structure composite wall, finite element software analysis and experimental exploration, the relationship between the shear capacity of the wall and the size of the component is obtained.

In 2011, Liu Yalin [6] published the practice and application of low-rise cold-formed thin-walled light steel structural system in post-disaster reconstruction. Based on the natural disasters in recent years in China, the research on the calculation method, seismic performance and construction superiority of low-rise cold-formed thin-walled steel structural members is discussed.

In 2013, Zhu Ming [7] published the application research of cold-formed thin-walled steel structure system in low-rise industrialized houses. By comparing the traditional residential building system with the cold-formed thin-walled steel structure system, the process of accelerating the industrialization of the cold-formed thin-walled steel structure system in China is obtained and applied in the vast rural areas.

Cold-formed steel structures have been widely used in foreign countries, and have shown good application prospects in China. By the end of the 20th century, the proportion of cold-formed thin-walled steel structure housing in North American construction housing was more than 30%; In Japan, where earthquakes are frequent, 80% of low-rise houses use cold-formed thin-walled steel structures; Australia's cold-formed thin-walled steel structure residential occupancy is also close to 50% [8].

At present, the research and application of cold-formed thin-walled steel structure houses in China is still in the stage of experiment and start-up. It is still unfamiliar to consumers and even engineering designers, and the specifications, standards and construction methods related to light steel structures in China. It is still not perfect, and related technologies are still in use more than ten years ago, lacking innovation and breakthrough. However, the prospect of cold-formed thin-walled light steel is unlimited. At present, the main middle and low-rise residential structures in China are still masonry and concrete structures, and the clay bricks required for this structural system are mainly derived from the calcination of the soil, which causes waste and ecological damage to be difficult to estimate. The production and construction mode with high investment, long cycle and low efficiency is more and more inconsistent with China's sustainable development strategy. From the beginning of the 21st century, China has vigorously developed the construction of a new socialist countryside and coordinated the development of urban and rural construction. Traditional residential building materials and technologies are difficult to achieve and meet this requirement. This requires us to innovate and transform new materials and new structural systems. These are all
indicating that the cold-formed thin-walled steel house is very suitable for the development of energy-saving and industrialization of buildings in China. Especially in the construction of new countryside, it has a very large promotion potential [9].

According to the development of China's building structure and the advantages of wood-plastics, China strongly encourages the development of wood-plastic profiles. The wood-plastic profiles themselves have great economic benefits and become the hotspot of the current building structure. According to incomplete statistics, as of 2013, the number of enterprises producing wood and plastic in the country has reached more than 150, which has driven economic benefits to a certain extent, and also provided more employment opportunities and reduced social pressure. The technical level of wood-plastic production in China has reached or exceeded the advanced level of foreign countries, and more and more foreign companies have begun to pay close attention to the development trend of China's wood-plastic industry [10].

At the end of the last century, due to a large number of deforestation, causing soil erosion and serious ecological damage, the state began to implement measures to close the mountains and raise forests, prohibiting the cutting of trees, resulting in the decline of wood on the market, the development of the wood industry is low, but the living standards are constantly improving. However, people's demand for wood is increasing day by day. Since the introduction of the technology of wood-plastic, domestic related industries have sprung up. Furniture factories, lumber mills, construction companies, wood-plastic raw materials companies, and flooring companies all joined the wood-plastic market and became active in this field. This also requires breakthroughs in wood-plastic technology.

Application Advantages of Light Steel-Wood-Plastic Structure

Good Seismic Performance

China is a country with many earthquakes. The Yunnan area (21 ~ 29°N, 97 ~ 106°E) is located in the southeastern margin of the Qinghai-Tibet Plateau. It is one of the most intense regions of the global crustal movement, with high frequency, wide distribution and high intensity. Refer to "Yunnan Earthquake Disaster Loss Assessment and Research 1992 ~ 2010", Yunnan Province Earthquake Disaster Assessment Report and "2014 Yunnan Statistical Yearbook", statistics for the period from 1992 to 2014: The earthquake disaster in Yunnan caused 1,209 deaths, with an average of 52.6 deaths per year. Among them, the deaths were the highest in 2014, accounting for 51.2% of the total deaths. A total of 44,903 people were injured, with an average of 1952.3 injuries per year, including the largest number of injuries in 1996. The proportion accounted for 38.43%, and the number of injured in 2014 accounted for 8.04% of the total number of injured; A total of 63.18 billion yuan of direct economic losses were caused, with an average annual loss of 2.747 billion yuan, and the highest proportion in 2014 was 2.62%. Today, with the rapid development of the economy, devastating earthquakes will cause more and more serious economic or property losses. Because the light steel wood-plastic structure is flexible and light in weight, the connections between the various parts of the components are all self-tapping screws, and the whole house is connected together, which can effectively reduce the seismic response and the degree of disaster damage, which is very beneficial to earthquake resistance.

Higher Economic Benefits

Since the light steel structure can be factory-made and spliced on site, the construction period is greatly shortened for small-scale buildings in rural areas; The whole house is made of light steel, no concrete beam-column plate is needed, and the light steel building has light weight. Under normal circumstances, it is not necessary to make pile foundation, which saves a part of investment. Wood plastic can be used as a decorative material to cover the surface of the light steel skeleton, which not only saves the cost of building decoration materials but also gives people a warm feeling. At present, light steel is gradually used in construction as an environmentally friendly material in China. The market price is lower than that of traditional reinforced concrete.
structures. Light steel is generally used for structures with large spans such as workshops, and the economic advantage is more obvious.

Development Prospects of Light Steel Wood-Plastic Structure

China's rural population accounts for the vast majority. The construction of new countryside will promote the rapid development of light steel-wood-plastic structure in rural areas of China; China and the world are promoting environmentally-friendly and energy-efficient housing construction, and the light steel wood-plastic structure just conforms to the development of the times. It is required that the light steel wood-plastic structure will become the majority of civil buildings in the future.

Conclusion

Light steel-wood-plastic building is an emerging green building. The specifications and standards for light steel structure in China are constantly improving. Various favorable factors are driving light steel structure houses to occupy the building market more and more. With the continuous development of the construction industry, the prospect of light steel wood-plastic structure is very broad, and the Chinese government also attaches great importance to the development of light steel construction. This structural system has played an active role in promoting China's development.

References