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Research on Housing Industrialization Technology System and its Construction Site Energy-Saving

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Abstract: Housing Industrialization Technology will be widely used in the field of Architecture as a new construction mode to build house, energy-saving, environmental protection, reducing emission of harmful dust and production of various kinds of pollutant. The difficulties and key points are analyzed of industrialized assembled housing system and construction technology and introducing its fabrication and installation, Housing Industrialization shows the advantages and development direction of industrialized assembled housing.

Keywords： assembled building system, energy saving, prefabricated assembly, calculation and comparison

INTRODUCTION

Housing Industrialization Technology is excellent production and management methods by standardization of design， product and making prefabricated constructing product in factory. It is considered to be helpful for the form of industrialization chain from the way of investment by developers planning, standardization of component design in Design Institute, production component prefabrication in factory and assembly construction to carry out standard steps in the field.

Housing Industrialization system is the transformation of comprehensive system of traditional housing industry with modern science and technology, as a new type of green environmental protection and energy saving construction; it contains high industrialization degree, the whole construction process of environmental protection and energy saving characteristics.

By optimizing the allocation of resources, reducing the consumption of resources, saving resources, reducing labor intensity of operating personnel and it has the characteristics of small influence on surrounding buildings; through the factory production and field assembly construction, to reduce construction waste ,construction of sewage, construction noise, harmful gas and dust emissions, improve the residential the project quality, functional quality and environmental quality of residential construction, improve labor productivity, realize the sustainable development of housing construction.

ASSEMBLY SYSTEM AND CONNECTION METHOD

Department of product system

The main parts of Industrialization housing can be divided into 5 categories.

1) Structure: part of beam and slab, column, staircase, balcony.

2) Interior decoration parts: indoor partition wall, interior doors and windows, scattered parts, building product pipeline.

3) Exterior decoration parts: filling walls, the ground, roofing, external doors and windows, retaining heat preservation and heat insulation wall decoration.

4) Kitchen and toilet part: the whole kitchen, finished products, finished flue duct.

5) Equipment parts: indoor air-conditioning systems, indoor water supply and drainage, water saving system, indoor air supply system, electrical and lighting systems, fire systems, elevator systems, renewable energy system.

Connection

Housing Industrialization Technology has three kinds of assembly system and connection method at present.

1) The component and structure of synchronous assembly system and connection method:

Synchronization and cast member mounted in the construction process of construction, using prefabricated wall panels on the inside of the reserved

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anchor bars and connecting with the structure, components installed in place , the wall panels with cast structural components are connected as a whole.

Both ends of the reinforced laminated reservation were set in structural walls or set aside within the pillars. Balcony panels and exterior air conditioning panels, leaving in connection with the structural reinforcement anchor beams, columns pouring together, the prefabricated stairs have the two forms of connecting with setting aside and keeping pouring anchoring tendons.

2) Column and beam structure firstly, then exterior wall components assembly system and connection Method:

The main structure of the cast columns, beams, plates, and then prefabricated fixed, plug connector system consists of two sets of bolts- prefabricated wall and down, which is connected with the cast iron beams embedded inside.

3) Prefabricated exterior wall construction and assembly module combination system connected Method:

The outer template by making component processing factory into is same with the prefabricate form .connected through external walls lined with cast silicon structures, the formation of the outer surface of the building's exterior envelope system.

Field Project Overview and Features

Woodcrest Hill Lake project is located in Hefei, China the Lake District and Fang Xing Lu Yulong road junction, Hefei is the first large-scale use of the way the housing industry built residential area. Nokia Meander project covers 164.88 acres, total investment reaching 1.6 billion, on the ground floor area of approximately 300,000 square meters, the basement floor area of about 44,000 square meters, floor area ratio of 2.74 the total number of 3040, a total of monomer 21, mainly 18 to 33-storey high-rise residential and commercial support. The construction unit is Bureau of Hefei construction of key projects, its Supervisor unit is Construction Supervision Co., Ltd. in Anhui Province, and the construction units include three, the first bid is Anhui Bao Industry Co., the housing industry, the second bid is Heilongjiang Yuhui Construction Company Limited and the third bid Hunan Yuanda Construction Company. These three construction units all use prefabricated construction.

The two project are industrial assembly monolithic residential Structural system, extensive using shear wall structure, monolithic silicon component assembly forms include: prefabricated wall panels, laminated floor panels, prefabricated stairs, prefabricated balcony, air conditioning outside of prefabricated panels and prefabricated component molds facades, wall off the hot-series aluminum alloy doors and decorative brick factory prefabrication in together when finished. Wall panels using anti-node self waterproof, medial, intermediate and outer set three water systems, which are the seal waterproof, waterproof and sealed cavity structure waterproof material. Waterproof node using prefabricated facades mold member surrounding leaving in recess, PE padding inside stopper rod outer sealed with waterproof silicone.

Prefabricated construction comparative analysis with traditional architecture

Traditional construction project data is from the adjacent residential development project by the Kaiping City Construction Group, The second phase of "Rafi mansion" with 7, 8, 9 Building. The structure of them is all shear walls, and their energy-saving condition is shown in table 1.

Table 1 Different ways of building energy-saving

	Traditional building projects	Industrialization of residential projects		The energy consumption difference	Explanation
	The Kaiping Co., Ltd	The Yuhui Co., Ltd	The YuandaCo., Ltd		
Electric energy(kW H/m^2)	16.9	12.12	11.9	4.8	Construction water
water (t/m^2)	0.691	0.47	0.5	0.21	Construction of electricity (Tower crane, vibrator, etc.)
Building template (t/m^2)	0.0125	0.0059	0.006	0.0065	The site for the cast-in-place Building template
Scaffolding (t/m^2)	0.0225	0.004	0.0038	0.0186	

RESULTS AND DISCUSSION

Through the comparative analysis of the conclusion can be obtained: compared with the traditional housing construction mode, using the way of industrialization construction can effectively save water, electricity, building template, such as the construction of consumables. Thus indirectly reduce emissions and carbon emissions in the production of such products energy consumption

CONCLUSION

Industrialization is the new green residential construction process of a new energy-saving building innovation and exploration, with a high degree of factory, good quality, and low material consumption advantages of standardization can fully reflect the residential construction, production and management of social integration and collaboration services. Many provinces in china has taken the lead to start the industrialization of residential construction and sales, the development of the residential construction industry in order to maintain the ecological environment and conserving natural resources as the goal of sustainable development with a mode of thinking and the use of technology, focusing on residential high-quality, defect, reduce waste, and rapid and environmental protection. Construction of residential building energy-saving industrial technology, as a new round of housing industry and to explore new ways to promote the industrialization of green building construction, site construction of the new model, provided an example of the housing industry by improving the quality of performance, improve production efficiency and enhance customer value as the goal, its overall economic and social effects far-reaching, as the city continues to promote housing construction, industrial residential building not only for the development of enterprises of great help with the promotion, but also for energy consumption, urban development, the majority of the people life has become increasingly apparent significance.

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