

# Integrated Decoration of New Commodity Houses Based on Supply Chain Management

Chen Lingyun

School of Management, Wuhan University of Technology, Wuhan, P.R.China, 430070

(E-mail: lychen\_5@hotmail.com)

**Abstract** In China, most new commodity houses are delivered to the house buyers roughcast so that they have to decorate them the second time before they can live in them. This paper points out the problems with roughcast delivery, analyzes the necessity and feasibility of integrated decoration of new commodity houses, and by comparing between the roughcast delivery under conventional management and the complete decorated delivery under supply chain management, recommends unified full-process management involving the planning and design, development and construction, and use and maintenance of house projects under the guideline of integrated supply chain, green supply chain and lean supply chain. It also suggests that the government enact encouraging policies, puts into effect the detailed rules for implementation of decorating commodity house once and for all to guarantee higher efficiency and lower emission and thereby pushes forward house industrialization and enable sustainable development.

**Key words** Supply chain management; Roughcast houses; Complete decorated houses; Industrialization

## 1 Introduction

To carry through the Several Opinions on Advancing the Modernization of Housing Industry to Improve House Quality by Ministry of Construction under document No. 72, 1999 and put into effect the Managing Method of the Indoor Fitment and Decoration by Ministry of Construction under document No.110 dated Jun 12, 2002, Ministry of Construction issued Detailed Rules for Implementation of Decorating Commodity House Once and for All on Jun 12, 2002 which is essentially intended to cancel roughcast houses step by step, provide consumers directly with complete decorated ready houses, regulate the decoration market and bring the house decoration from orderless production to orderly production. However, this Rule has not been enforced yet. In this paper, the writer points out the present state of new commodity house decoration in China and existing problems, analyzes the necessity and feasibility of enforcing the Rules and suggests that applying the integrated management of supply chain will accelerate the implementation of the Rules. The implementation of the Rules will help improve the efficiency of real estate development, reduce the construction duration, guarantee the quality, bring down the cost, advocate energy efficiency, channel low carbon economy into people's everyday life and speed up industrialized and intensive house construction.

## 2 The Theory of Supply Chain Management

Supply chain management (SCM) is an integrated management idea and methodology that integrates and optimizes the information flow, material flow and capital flow on the supply chain by improving the up- and downstream supply chain relationship to obtain competition edge of the corporate. Supply chain management is to manage the entire chain as a whole and actually covers all the activities of the corporate as an integral and unified process.

By applying supply chain management, we will be able to combine house decoration with the house design, construction, installation, parts, supervision, marketing, property management, use and maintenance on the whole house supply chain together for integral consideration and implementation. Commodity house decoration includes decoration design, material procurement, decoration construction, engineering supervision and decoration acceptance which, when integrated into the integral supply chain for scientific planning, will contribute to proper resources configuration and win-win among all the parties involved.

## 3 Present State of New Commodity House Decoration in China and Existing Problems

### 3.1 Present state of commodity house decoration in China

In China, most houses are delivered either roughcast or complete decorated houses. Of all the commodity houses delivered every year, 80% are roughcast ones, also called “roughly finished houses” or “clear-water houses”. These houses generally provide simply exterior decoration and public utilities, installation and fitment of pipe and power supplies without any decoration inside. In fact, they are only framework with power line installed at the door, a water main and a main sewer inside the house without any design. Most houses only have doorframes inside without doors and the wall and floor are only basically treated without any surface finish. To live in the house, you have to make every necessary decoration like finishing the wall and the floor, fixing the interior doors, lamps and sanitary wares, designing and routing the power line, water pipe and sewer by yourself. Roughcast delivery is a special product in the 1990s when China’s real estate was just taking off; people were living at a low standard and did not expect much of their houses.

With the growth of the economy and improvement of the living standard, people are expecting higher quality and environmental protection of their houses. Complete decorated house is becoming more and more popular which means that all the fixed sections of the functional spaces are paved or painted, all the basic equipment in the kitchen and toilet is installed before the key is delivered. In economically developed countries like Shanghai, where complete decorated houses in the downtown area account for over 60% of all the commodity houses in the city and Shenzhen, where all the houses are required to be 100% complete decorated by 2010, compared to the less developed regions like Ningxia, where complete decorated houses take up less than 5%.

### **3.2 Existing problems with new commodity house decoration in China**

#### **3.2.1 Resources waste**

A roughcast commodity house (roughly finished house) has to receive a secondary decoration by the owner after it is delivered. Most frequently, a secondary decoration will include removing the interior partition wall and window sill railing, chiseling open the concealed lines behind the wall surface, roughing the floor cement mortar screening and the like, which completely destruct the rough finish of the house and produce numerous building rubbish. According to statistical data, a 100sq.m house decorated by the owner will produce an additional 2t of building rubbish. In 2009 alone, the built area of commodity houses in China was 5,769,400sq.m, approx. 6 million houses, which means an additional 10 million ton of building rubbish. At this time when people are advocating “low carbon economy” and “green buildings”, it is imperative that the self-decoration by consumers be changed.

#### **3.2.2 Noise pollution**

When a new house development is delivered, each of the owners may decide their own time for settlement and decoration and the whole residential quarter will come into successive decoration. In fact, the quarter will become a nuisance of decoration sites equivalent to the number of households contained in it. At the average decoration duration of 2 months, the huge noise from the later decoration will impose great disturbance to the owners already settled down, and such noise pollution won’t die out in 3-5 years after the delivery.

#### **3.2.3 More difficulty for property management**

For a housekeeping company, management of secondary decoration is always on the list of their troubles. The safe access of decoration materials, the restriction of decoration hours, the management of decoration teams, the removal of building rubbish, the protection of house structure and public utilities, and the coordination of mutual disturbance between the owners add to the difficulty of the housekeeping work. What’s more, legal controversies keep coming out of property management related to secondary decoration. All these play a negative role in creating a harmonious community.

#### **3.2.4 Destruction to public facilities and house structure from secondary decoration**

When an owner makes a secondary decoration, he is most likely to dismantle the wall, drill holes, enclosing the gazebo, putting up a roof-top sunshine room and even digging the ground for a basement, which endangers the structure, fire and seismic protection of the whole building. When they decorate the kitchens and toilets, they will destruct the wall and floor waterproofing and lead to damage to themselves and their neighbors. When bulk or heavy decoration materials are handled, they often destruct the wall, floor or elevator in the public spaces. These accidents in decoration are negative for the owners’ conservation of the public benefit.

#### **3.2.5 Decoration being too consuming for house buyers**

The majority of house buyers do not know much about decoration, nor do they have any professional experience as to the identification of materials, control of cost and management of the decoration team. As a result, in spite of all the time, money and effort injected into the decoration, they

frequently find themselves unsatisfied with the result. Some owners even have the experience of being cheated. Information also shows that complicated decoration details are one of the causes for family conflicts.

#### 3.2.6 Confusion of legal liability

It is usually hard to tell whether any problem with house quality is caused by the developer or the secondary decoration when a house is decorated by the owner himself, which will result in buck passing between the developer and the decoration team and the eventual victim will be the owner himself.

#### 3.2.7 Negative for regulating the decoration market and developing decoration business

Accompanied with the development of real estate is the decoration industry, with many negative factors on further growth of the business. According to statistics, only 35% of the market share is taken by professional decoration companies competent both in size and grade, with the remaining 65% in the hand of those “guerillas” who have neither qualification nor work permit for the construction workers nor a business license, their only advantage being the low prices, which are often related to jerry building, inferior materials, under-standard environmental indexes, poor after service and contract traps.

## 4 Necessity and Feasibility of Integrated Decoration of New Commodity Houses

### 4.1 Necessity of integrated decoration of new commodity houses

#### 4.1.1 For energy efficiency and environmental protection

Complete decorated house is based on the demand of house buyers such as the family structure, service functions, specific climate, cost expenses and social culture. The whole product is attended and supervised by professionals from the design, construction through acceptance so that the owners can settle down directly after the acceptance. This not only avoids the potential noise pollution, destruction to the rough finish and public utilities, but also largely reduces the building rubbish that may come along with the secondary decoration by the owners.

#### 4.1.2 For full utilization of resources

Complete decorated house is managed by developers based on the whole supply chain so that they will maximize the effect of the supply chain with all their resources available. Developers will try to optimize the design, seek balance between the construction cost, use cost and maintenance cost to cut down on the overall cost. In procuring materials, developers may turn to group procurement and guarantee stringent examination over the material quality and environmental issues by professionals to control the material supply. In construction, developers may shorten the duration and reduce the cost by alternate operation like shop fabrication of semi-finished products by fixed subcontractors and field installation. They may also add central heating (cooling) to the houses as required by the house buyers. For secondary decoration by individual house buyers, resources will never be maximized. With complete decorated houses, the owners will only have to examine and accept the houses and put the rest of their resources in their work, families and everyday life, thus enabling substantial utilization of the resources of the whole society.

#### 4.1.3 For improved quality of product houses

Roughcast delivery focuses the attention of both developers and house buyers on the physical location, surrounding environment and community infrastructures of the houses. As for house products themselves, people are concerned more about the layout, orientation and visual pleasure. However, many developers neglect increasing the added value of their products though applying hi-tech products in the houses will greatly upgrade their products and the improved product quality will in turn provide both material benefits to the users and abundant payback to the developers themselves. Added value of house products may also be represented by refined culture and individualized owner service that are well worth effort. Of course, however, all these ways to upgrade the house quality will have to be based on integrated decoration of new commodity houses.

#### 4.1.4 For inhibition of house speculation

Currently, curbing the over-rise of house prices has become one of the principal objectives for economic control, which is particularly necessary in Beijing, Shanghai, Shenzhen and Guangzhou where over 25% of the houses are bought by investors. Conventional roughcast delivery is favorable for house speculation mainly because of the limited depreciation of roughcast houses in a short time. For transaction of complete decorated houses, on the other side, investors will have to think about the risk of decoration depreciation, while from value increase of the property itself, no noticeable advantage is found in the prices of decorated houses. Therefore, integrated decoration of new commodity houses is good for curbing house speculation and plays a positive role in balancing house prices.

## **4.2 Feasibility of integrated decoration of new commodity houses**

### **4.2.1 A powerful demand market for complete decorated commodity houses out of people's pursuit of house quality**

With the rapid growth of China's economy and great improvement of people's life, consumption of houses is changing both in the idea and manner. Especially for those secondary house buyers, house consumption has changed from basic need to comfort. The change of people's life style is pushing hi-tech low-carbon houses to the spotlight and the existing roughcast houses are far from accommodating the market. A survey of some large cities like Beijing and Guangzhou shows that 60~70% of the buyers are willing to ready to pay for complete decorated houses now from the 45~50% in 2000. A survey of Shanghai shows that 80% of the house buyers believe complete decorated houses are the trend of development and 68% of them are ready to buy complete decorated houses. This proportion will be growing up year by year. Of the owners of complete decorated houses, more than 90% are satisfied with their houses. There is no doubt that complete decorated houses will become a prevailing product on China's future house market.

### **4.2.2 Development orientation of the house industry directed by the sustainable development strategy.**

While China's real estate development dates back to a merely 20 years ago and the sustained growth of house demand and urbanization of the country has led to huge achievements in China's real estate, many contradictions are also finding their way in the uncontrolled low-level productivity and rapid growth of real estate industry, especially when improvement of the housing is based on excessive consumption of resources. In the 17th Party Conference Report, eco-civilized construction cored round energy conservation and environmental protection is high on the country's agenda for sustainable development. It is obligatory that the house construction sector follow the human-oriented, overall, harmonious and sustainable development, employ effort on energy resources efficiency and rational utilization and encourage developing energy- and land-efficient houses, which is to emphasize both development and efficiency under the general principle of energy efficiency, land efficiency, water efficiency and material efficiency, put efficiency in the first place, try to avoid wastage of energy, land, water and material throughout the planning, design, construction, use and maintenance of houses, conduct resources conservation and recycling and provide more proper house functions and greater dwelling comfort with less resources consumption. This is the general guideline for the current house construction under which conventional house production is no longer compatible with the objective requirement of building a resources-efficiency society.

### **4.2.3 Readiness for complete decorated commodity houses resulted from improved management ability of developers**

From the real estate practice in China, a great number of developers have gained substantial management experiences like Vanke, Gemdale, Poly, Evergrande and China Resources, who are well able to manage real estate supply chain. Vanke, for example, suggested "building houses at shop" early in 2002, which was followed by the first market-oriented industrialized production development of two high rises in 2006 by Shanghai Vanke New Milestone. This project represents Vanke's many experiments and explorations in standardization and industrialization. The whole process of the company's shop production is an integration of work division and interfacing of all the supply chains, including planning, design, construction, installation, parts and supervision, involving some 50 core partners and more than 200 standards, and a tight connection between Vanke and its partners. Poly, for another example, managed to integrate priority resources at low cost at the market downturn in 2008 which contributed to the combination of the supply chains of related resources both up- and downstream of Poly land property. The improved management ability of these developers helps prepare China's real estate for popularizing complete decorated houses.

## **5 Measures for Integrated Decoration of New Commodity Houses**

### **5.1 Integrated supply chain management**

Apply integrated supply chain management, integrate resources and deploy systematic efficiency of the project. Complete decorated houses result in additional time of construction due to the decoration work involved. Vanke, for example, had to take an additional 3 months for complete decoration. The extension of delivery prevents many developers from making complete decorated products. But, if they conduct supply chain management, control priority resources around their own strategy, outsource or reorganize the non-core competitive businesses, decide the shares of the other enterprises on the supply chain and integrate the whole supply chain by making decisions on the design, quality acceptance and

finalizing the house prices, they will become the largest beneficiary of the whole supply chain. In spite of the possible extension of house delivery, for buyers, this frees them from the time and trouble they would have to employ in designing the secondary decoration, altering the rough finish and working on the decoration.

**Table 1 Breakdown Work of Roughcast Delivery under Conventional Management VS Complete Decorated Delivery under Supply Chain Management**

Stage of project	Roughcast delivery under conventional management		Complete decorated delivery under supply chain management		Comparison
	Activities	Participants	Activities	Participants	
Stage 1: startup	Feasibility study/ Program design/ Project approval	Developer/ Design institute/ Government authority	Feasibility study/ Program design/ Project approval	Developer/ Consultant/ Design institute/ Government authority	The same activities are involved at this stage, with different details of the feasibility study and program design.
Stage 2: planning and design	Planning & design/ Construction drawings design/ Gardening design/ Project scheduling	Developer/ Design institute	Planning & design/ Construction drawings design/ Decoration design/ Gardening design/ Marketing planning/ Project scheduling	Developer/ Design institute/ Decoration company/ Consultant/ Housekeeping company	Under complete decorated delivery based on supply chain management, the decoration contractor is involved when the civil design is finalized to solve the interfacing between civil work, equipment and decoration. All the designs are based on comprehensive investigation by a professional consultant, the rationality and economy of property use.
Stage 3: implementation	Tendering & contract awarding/ Civil work construction / Installation construction / Project marketing/ Integral acceptance	Developer/ Civil work installation contractor/ Supporting utility contractor/ Government functions	Project tendering & contract awarding/ Civil work construction/ Parts procurement/ Installation construction/ Project marketing/ Decoration construction/ Integral acceptance	Developer/ Civil work installation contractor/ Supporting utility contractor/ Suppliers of different parts/ Decoration contractor/ Government functions	Under complete decorated delivery based on supply chain management, some decoration parts may be tendered in advance so that they will be fabricated at the same time of the civil construction and worked alternately with the decoration, which will result in a little extension of the overall work duration.
Stage 4: delivery to users	Property handover/ House delivery/ Secondary decoration/ Maintenance & use	Developer/ Housekeeping company/ Owner/ Decoration company/	Property handover/ Delivery to users/ Maintenance & use	Developer/ Housekeeping company/ Owners	Under complete decorated delivery based on supply chain management, the owner can settle down without secondary decoration, compared to the conventional roughcast houses where the owner has to take 3-4 months for the design of the decoration, alteration of the original decoration and new fine decoration. So, the actual time of occupation will not be delayed.

**5.2 Value enhancement supply chain management**

The potential for higher value and lower cost of a product mainly lies in the supply chain management involved. Many developers may assume greater input and higher risks in complete decorated houses. In fact, supply chain management will force developers to find potential in the

product value and apply hi-tech house products like Central Vacuum System, Fresh Air System, Indoor Automatic Fire Alarm System, Electronic Patrol System, Background Music System, Electronic Fingerprint Lock, Small VIW Air Conditioning, Bridge-Cut Insulating Double Door and Window, Ground Source Heat Pump, Same Floor Drainage, BNN Thermal Therapy Bathroom Warmer, Ceiling-Mounted Soft Micro-radiation System, Building Enclosure Optimizing System, Self-Cleaning Nano Coating, Exterior Wall External Insulation, Food Scrap Crushing System and Split Solar Central Water Heating System, which will all contribute to a differentiated product and increase the competitiveness of the product.

Supply chain management also brings down the cost of the developers. The design of civil work and decoration should include modular, standard and universal materials to minimize material wastage in the decoration. “Shop decoration” is less exposed to the weather, saves the work duration and guarantees the quality of the decoration materials. Mass decoration also helps deploy the cost advantage of group procurement, and the improved skillfulness of the workers will also help increase the production efficiency. By supply chain management, developers will directly reduce the cost, increase the value and thereby maximize their benefit.

### **5.3 Green supply chain management**

Green supply chain goes throughout the lifetime of the project. In conventional real estate project management, developers are more concerned about the building cost in the design stage of the project in addition to safety issues, the conformity to the government regulations and whether the project will pass approval; in the construction of the project, they are more concerned about the construction quality, progress and control of the building cost. Nevertheless they usually ignore how to mitigate the subsequent use and maintenance cost and how to increase the future benefit from environmental protection. In fact, evaluation of a real estate development should be an integral consideration of the land, design, construction and the use of the property in the 70 years to follow. The government requirements for both green buildings and sustainable cities call for green supply chain throughout the project management. The deciding factor for a successful real estate development lies in the planning and building design stages. High-quality design is the prerequisite for high-quality products. A successful project embodies the “environment-sourced, human-oriented” guideline throughout the design process, transform the long separation of building design and decoration design of houses in China and link the two closely to each other. Besides, other supply chains like marketing companies and housekeeping companies should also be included for collaboration. The design should incorporate natural ventilation, day lighting, heat insulation, concrete approaches of water recycling and power conservation, application of hi-tech materials with proper arrangement to avoid impact on the house users from the supporting utilities and mutual distance among the users. Only by continuously optimizing the design programs and implementing complete decorated delivery will the “green building” slogan take root in China.

### **5.4 Lean supply chain management**

Lean supply chain will compromise complete decorated houses to the demand for individualization. Complete decorated houses do not necessarily mean homogenous and unalterable decoration for all the users. The decoration design may also involve building design, interior design and other professional companies to design different styles for the house buyers according to the specific project, layout arrangement and the preference of the target users. Under different decoration styles, a menu-like decoration order may also be provided to detail the breakdown items and unit prices so that the buyers will select different functions, prices and qualities specific to their own demand. In the design, more work should be done on the ornament than the fitment leaving substantial room for any necessary individualized decoration by the owners themselves in future. To make this, close coordination between all the parts of the supply chain is the most essential. To enable quick and detailed response to users, it is important to provide standard detailed rules and procedures for each part of the work, perform informational management and provide access to sharing information.

### **5.5 Suggestion to government**

It is advisable that the government should issue supporting standards and policies to encourage popularization of complete decorated houses. Promotion of complete decorated houses is the only way to house industrialization. The government is obligated to provide good environment on the policy level. Speeding up house industrialization is the only way to sustainable development.

#### **5.5.1 Establish standards**

Delivering new houses complete decorated is still in the initial stage in China with no available inspection and evaluation standards. Shop decoration incorporating assembly parts is the imperative

trend of house industrialization which helps control the work progress and construction quality effectively. In nature, it replaces the conventional uncontrolled labor-intensive handwork production with technology-intensive mass production and thereby upgrades both the quality and grade of the houses. To reduce the cost and favor the users, the developers have to integrate all the parts for central procurement. Besides, to minimize indoor environmental pollution, all the materials used have to conform to the latest national standard for environmental protection, energy conservation and water conservation. To make this, more effort is required for the industrialization of house production, which is far beyond the developers themselves. As a result, the government should first publish standards and enable standard, modular and general building products and parts in house construction in a shortest time possible.

So far, no standard is available for complete decorated house delivery. The standard, quality and pricing of decoration remains with the developers. To ensure healthy development of complete decorated house delivery, the state should establish industrial standards to restrict and regulate the details of complete decorated house delivery and establish an evaluation system. Establishing standards will enable house buyers to judge the house prices in the right way and financial institutions to provide the right evaluation.

#### 5.5.2 Advance incentive policies

As complete decorated house delivery advocates energy efficiency and is good for building a resources-efficiency and environment-friendly society, the government may provide preferential policies for the enterprises and individuals involved to promote construction of complete decorated houses. In terms of tax policies, it is advisable to exempt or relieve the enterprises from land VAT, income tax and other auxiliary tax burdens; for consumers of complete decorated house products, preferential policies may be provided in terms of deed tax, house loans interest and loans proportion, to direct the consumption tendency on the policy level. In financial and credit policies, support can be given to the enterprises by providing standards for the borrowing quota, lending node and even the loans interest rate.

The government may also enhance and accelerate the industry under the guideline of house industrialization and from the full-process supply chain management of house products and service, deploy the collaboration among all the parts on the supply chain and maximize the industrial effect.

## 6 Conclusion

Whether for improving the house quality, advocating green economy or for accelerating house industrialization, integrated decoration of new commodity houses in China is always a proposition of times of extensive significance and value. Under the current market conditions, both developers and the government should follow the guideline of integral supply chain, green supply chain and lean supply chain, keep improving industrial standards and supporting policies, deploy industrial collaboration, put into effect the Detailed Rules for Implementation of Decorating Commodity House Once and for All, and thereby enhance the sustainable development of China's house industry.

## References

- [1] Liu Minnan. Systematicness and Adaptability of Complete Home Decoration: On the Practice and Theory of Complete Home Decoration in Shanghai[D]. Shanghai: Tongji University, 2007 (In Chinese)
- [2] Xue Dong. On Industrialized Decoration of Complete decorated Commodity houses[D]. Shanghai: Tongji University, 2005 (In Chinese)
- [3] Liu Mingfei, Wang Huailin. Logistical Management[M]. Beijing: Science Press, 2008 (In Chinese)
- [4] Jin Minhua. Overturning the Development Model of Real Estate in China, Vanke to Build Houses at Shop[N]. Shenzhen Economic Daily, 2005-10-10(8) (In Chinese)
- [5] Ren Jinmin. Can "Complete decorated Homes" Push aside Roughcast Houses?[N]. Shenzhen Economic Daily, 2008-12-9(2) (In Chinese)