

# Long-Life Quality Housing and Development of New Infill Systems in Japan

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## LONG-LIFE QUALITY HOUSING

Because the average life span of newly-built houses in Japan has been very short compared with those of European countries and the United States, the new law called "The Act for Promotion of Long-Life Quality Housing", which promotes the longer life of housing in Japan was implemented from June 4th, 2009. We build high quality houses and take scrupulous care of them to preserve them for longer periods of time. The lengthening of the life of a house must be useful to reduce the consumption of natural resources, the economical burden of housing expenses for families and should help solve the global environmental problems and waste problems in the future. The technical guidelines consisting of nine chapters explain the technical details required for extending the life span of housing. The client can apply for tax reductions and can receive subsidies by designing and building a house which complies with the new law and technical guidelines. The total number of units of Long-Life Quality Housing approved in Japan since its establishment in June, 2009 is 309,972 at the end of August, 2012 (Figure 1). Most of them are detached houses. Only 7,962 units were condominiums.

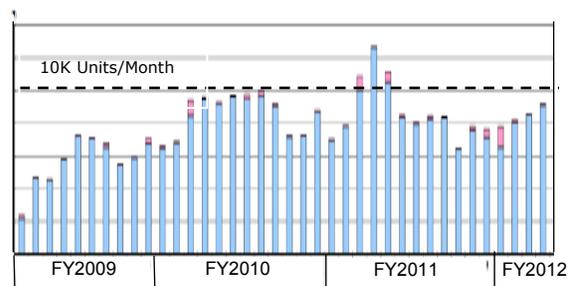


Figure 1 The total number of units of Long-Life Quality Housing approved in Japan\*<sup>1</sup>

Chapter 3 of the technical guideline is about the easiness for maintenance and renewal. It is required that the common piping of condominium apartments must be maintained without entering private parts of dwellings. Many of the condominium developers thought this requirement would be very hard to accomplish in their design. As shown in Chapter 4, the adaptability requires that the distance between the floor slabs of the base building must be 2,650 mm or higher for the piping and wiring according to modifications of the original room layouts. The developers thought this requirement would increase the cost of condominium apartments. In spite of these difficult requirements, we can find some condominium apartments actually built based on the act and technical guidelines.

The first Long-Life Quality Housing built in Japan was the "Branchera Urawa", built in May 2011. It is located about 30 minutes north of JR Tokyo Station. It has 69 units. The size of a unit ranges from 80 to 93 m<sup>2</sup>. It was developed, designed and constructed by Haseko-Cooperation, which is one of the largest condominium developers in Japan. Up to now, they have built around 520 thousand condominium apartments out of 5,790 thousand units across Japan. As you can see in Figure 2, the mechanical and electric pipe shafts can be maintained from the outside of each unit, which means from the common corridors. The architect demonstrates the variations of plans and also the adaptability over time. The same unit can be used as a 1-4 bedroom apartment. The pipe shaft can be maintained from the common corridor without entering inside.

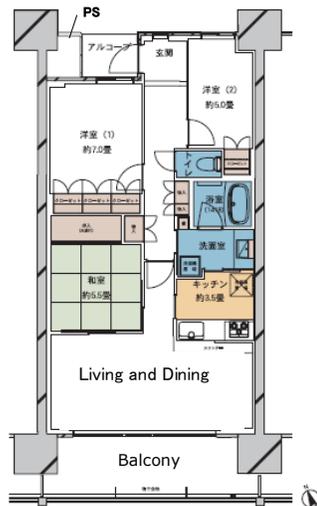


Figure 2 Floor Plan of the Branchera Urawa, Haseko Cooperation\*2

The second Long-Life Quality Housing, the “Branchera Suita Katayamakoen” was completed in July 2011. It is located about 10 km from JR Osaka Station. It has 114 units. The size of a unit ranges from 79 to 107 m<sup>2</sup>. This apartment was also developed by Haseko-Cooperation. The pipe shafts can be maintained from the outside of each unit. This condominium apartment has under floor space of 275 mm for piping and allows flexibility for the location of bathroom, kitchen and toilet (Figure 3). The partitioning walls stand on the floor system which makes it easier to change the position of the walls. Figure 4 shows how the same unit can be used by a family without children or by a family with children. It can be equipped with a movable partitioning wall system and a movable storage system to divide the rooms. The residents may use these systems to change the plan of the units according to changes in their lifestyle and family structure. The exterior walls of the apartment are composed of a dismantlable facade system (Figure 5) which makes it easy to fix and to remove the walls. The architect developed the piping system for the drainage and sewage water which has connections that make replacement of the pipes easy. The piping for the supply water is made of stainless steel for a longer life.



Figure 3 Section of the Branchera Suita Katayamakoen, Haseko Cooperation\*2

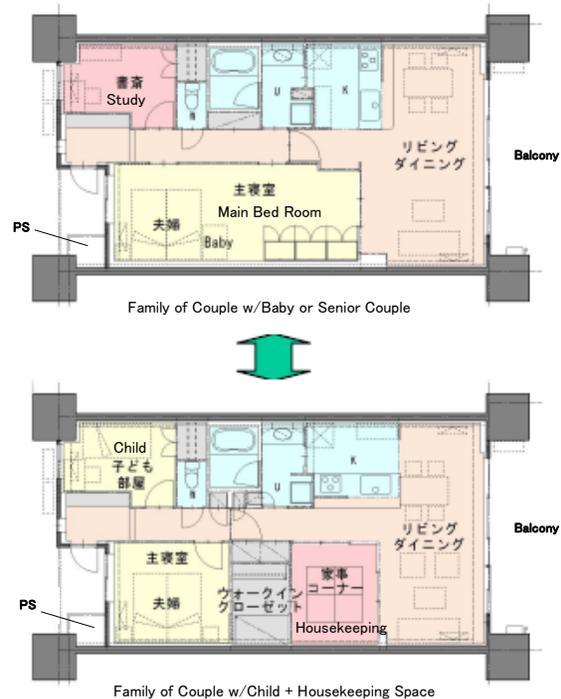


Figure 4 Alternative Floor Plan of the Branchera Suita Katayamakoen, Haseko Cooperation\*2

Because of the social requirement for longer life of housing, developers are aiming at the continuous customization for the residents during their entire life. Technically, enough under floor space for piping is necessary to change the plan. Also the pipe shaft must be maintained from the outside of each unit to fix and replace the pipes when it becomes

necessary. We have had the experience of free plan rental housing where residents design and own their fit-out, but unfortunately, because of the cumbersome management of fit-outs when tenants leave their house, the owner of the public housing has become reluctant to continue this housing system.



Figure 5 Dismountable Facade Systems for the Branchera Suita Katayamakoen\*<sup>2</sup>

### **EFFICIENT CUSTOMIZATION OF HOUSING**

About 14% of Japanese newly-built houses are constructed by industrialized house producers like Sekisui House. Sekisui House started its business 50 years ago and has built more than two million units of houses in Japan. They can offer their customers houses with unique designs. The design of the house is customized according to the customer's requirements. The customer and architect make the drawings of the house at the office and send it to the factories by e-mail. The robots in the factory lines produce the building parts according to the drawings. The building parts are loaded onto a truck according to the construction schedule and delivered to the construction site.

PanaHome Corporation is another large industrialized house producer in Japan. By visiting the website of PanaHome Corporation, the customers can enjoy designing their house by themselves, using kits of parts of the house assisted by 45 pages of text for housing design (Figure 6). The customers can exchange their ideas with an architect through the web site before they actually meet him and the salesperson at the customer's office. PanaHome Corporation makes the most use of information technology to attract customers. At the same time they reduce the time and cost of consulting. Similar marketing tools are used

by other industrialized house producers like Misawa Homes.

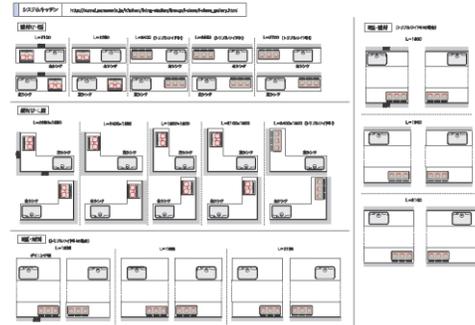


Figure 6 Kits of parts of PanaHome Corporation\*<sup>3</sup>

The Japanese industrialized house producers are taking much advantage of information technology to make it possible for their customers to feel they are designing their house by themselves. Their data communication between the customer's office and factories allow them to build a unique house at a reasonable cost in a short period of time. The author believes we need to discuss whether or not the customers are obtaining true satisfaction from what the developers and house producers are offering. At the same time, the author thinks it is important for the condominium developers to allow for more variety in the design of their infill systems. They might be able to share various infill products such as windows, kitchen and bathroom systems, and exterior and interior finishing with the industrialized house makers. By getting more volume of purchasing, both the condominium builders and the industrialized house makers can enjoy higher quality of infill products at less cost and with more variety.

### **DEVELOPMENT OF NEW INFILL SYSTEM**

The author has started a five-year research project to develop a new infill system using traditional wooden carpentry skills while promoting the local industries by marketing the products with an award from the Ministry of Education, Culture, Sports, Science & Technology in Japan. The new infill system uses wood products manufactured in the Shin

Kiba area of eastern Tokyo where many wood factories located traditionally. Shibaura Institute of Technology, where the author works, is located close to Shin-Kiba, and the local government is keen to help the research and development of local industries. The research group directed by the author tries to establish a new business model for those wood manufacturing companies to increase the infill products.

In the NEXT21 project that was completed in October 1993, resident testing continues, and in phase 3 of the testing, reform work and room change testing is being carried out in response to the emergence of an aging society with fewer children<sup>\*4</sup>. The Urban Renaissance Agency has carried out an infill refurbishing test project called "Rakuinkyo" in existing condominiums for home-based care<sup>\*5</sup>. NEXT-Infill, developed by NEXT Corporation, is a high quality base for infill work<sup>\*6</sup>. It is taking time, but use of this product is growing. In Japan, using conventional methods, production efficiency of infill has been high, and low-cost, so it has been difficult to get the market to use advanced infill products which have been developed up to now. The aim of this research is to develop infill products which are demanded by the market.

The author tries to develop a new infill system which can be used both for new construction and refurbishment. The new infill system must be adaptable for changing lifestyles of the residents and must be easy to be fit and removed. It may be used not only for condominium but also detached houses, which is larger market in Japan. The author will carefully examine the characteristics of the future infill market in Japan to find the most attractive infill for the residents and also for the housing industries.

Haseko-Cooperation has specific decision making spaces called "LIPS" (Living Image Presentation Space) in Tokyo and Osaka, where developers and architects can select almost all exterior and interior finishing and mechanical and electrical systems for their design. Eighty infill makers present their new products at the LIPS. Designers can compare

the differences in the design and quality of each of the infill products presented alongside each other in the presentation space of 1,000 m<sup>2</sup>. Haseko-Cooperation even develops its original new infill system by collaborating with the company's Technical Research Institute, the developers and the residents of condominiums. Haseko-Cooperation not only designs and builds condominiums, but also manages, repairs and refurbishes existing housing it built in the past. The knowledge acquired by taking care of the houses for a long time helps to develop new infill products. Haseko-Cooperation can continuously get feedback from the developers and the residents concerning their infill finishing. The Haseko-Cooperation Technical Research Institute has already started the research and development of a new infill system for the refurbishment of existing condominiums, to extend their life and provide better quality life for the occupants.

## CONCLUSIONS

The development of infill systems never ends because the life style of people is continuously changing. The author believes the most important point for the success of new infill products is whether or not the designers thoroughly investigated the customers' needs. No products can be purchased by the developers unless these products reach the expectations of the residents. This is not a new finding but the researchers and architects need to know in depth what the residents really want.

## REFERENCES

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