

Development of the Public Housing Unit in Japan

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Abstract

The paper intends to clarify the development of the Japanese public housing in the 60 years history especially in terms of the unit plan observing through the activity of the Japan Housing Corporation, that took an important role in the spreading of the housing method in Japan. The characteristics of each developing stage are analyzed: minimum unit plan, standard plan, high-density plan, three-generation house plan and post n-LDK unit plan. These planning reflect the needs of the public and the government policy, that has been strongly influenced by the economic circumstance, and also show the change of residents' life-style in each time.

Keywords: Public Housing, Unit Plan, Japan Housing Corporation

1 Aim and scope

Japan has promoted its public housing strongly since the early 1950s when the postwar revival was almost achieved and the dramatic economic growth started. The most influential and major housing authority has been the Japan Housing Corporation (JHC 1955-1981, now Urban Renaissance Agency (UR) has succeeded to the JHC 2004-) that influenced not only on major cities housing but also on local housing in Japan in terms of the planning method. The aim of this paper is to clarify the role and the unit plan of the JHC corresponding to the needs of each period since the 50s.

During the postwar revival, the major cities especially Tokyo were confronted with the population explosion of young working people coming from the country. In order to mitigate the huge housing demand, the government took measures to deal with the problem by establishing the government housing loan corporation (GHLC) in 1950, the JHC and the public housing act in 1951 that were the three pillars for housing policy. The loan system accelerated the increase of detached house owners and the JHC dealt with both houses for sale and rent mainly for the middle income families. The public housing act has activated the housing construction by local governments for low-income families, and the JHC unit plan has been copied or referred frequently in the early stage. It has been popular and accepted among the Japanese to obtain house ownership was one of major aim of their lives and the government supported their goal in order to accelerate the Japanese economic growth also in the early period. The early 70s was the zenith of JHC construction and about 45,000 units were constructed in 1972. The largest scale project was called Takashimadaira housing in Tokyo (1972) consists of 10,170 units.

1950s	1960s	1970s
<ul style="list-style-type: none"> • Huge demand for housing • JHC founded 1955-1980 	<ul style="list-style-type: none"> • Rapid economic growth 	<ul style="list-style-type: none"> • Policy-change from quantity to quality
Minimum unit plan 2DK type	Standard unit plan n-LDK type	Large scale high density housing South-North axis bldg. layout
1980s	1990s-	
<ul style="list-style-type: none"> • Demand for long term living in multiple dwellings 	<ul style="list-style-type: none"> • Development of ICT • Rise of an aging society 	<ul style="list-style-type: none"> • Change of a work style • UR succeeded to JHC 2004-
3 generation family unit plan	Post n-LDK unit plan	SOHO housing

Figure 1. Development of public housing

In 1973 the national housing statistics showed that the number of house had exceeded that of household. Then the government changed the housing policy to enrich the housing quality rather than the quantity. The JHC has planned larger house units and comfortable living environment according the policy and also following the

needs of the public and their life styles. The total number of the house unit is 883,083 and that of the housing project is 2,029 provided by the JHC and the UR throughout 60 years.

The paper has a focus on five topics of house planning method that reflect the public needs of the time and architects' response. These are the minimum unit plan, the standard plan, the high-density plan, the three-generation house plan and the post n-LDK unit plan.

2 Minimum unit plan (1950s)

One of the typical house units in the early stage of the JHC housing is the 2DK unit plan designed in 1955. The total floor area is about 45 m² and it was minimum size designed for middle-income nuclear families. It was the JHC's main concerns to provide fireproof multiple dwellings as many as possible with healthy and decent quality for the living.

In the early 50s, huge amount of working power has concentrated in major cities and it caused a serious lack of their housing. The government had started housing research and planning for the working middle class family collaborated with academics in the late 40s. The important principles for a healthy and decent family life gained from the research were to separate bedrooms from a dining room and a master bedroom from other bedrooms to secure minimum living quality of their modern homes. In 1951 based on the result they planned a minimum unit of 40 m², that was prior to the JHC model in 1955. That is the development of the former unit with a bathroom for it was popular to go to a public bath at the time.

For the design of the unit, architects have made an at most effort in a compact floor plan affordable for the family. There were two effective measures that they adopted for the plan: a system kitchen and a flush toilet. The former consists of a sink and a cooker that are contained in a single stainless steel panel. The system kitchen was newly introduced in Japan influenced by the American modern living that was a longed-for life style among women because of the reduction of heavy domestic daily work. The latter contributed much to compact the floor plan avoiding the connection space such as a corridor without an offensive smell indoor.

The name of n-DK type was invented for the modern housing unit plan to indicate the number of bedroom and a dining-kitchen room. Later the enlarged DK has been called LDK that means a living-dining-kitchen room. The 2DK plan was a small unit but it attracted many young families because of the trendy modern living style and its affordability and it was very hard to draw a winning number at the first stage. The rent for the unit was set at 40 % of the average salary that was thought to be the limit of the affordability.

Though the 2DK plan was a marvelous design at the first stage, it soon became small for the residents with the growth of their children. At the early stage of the planning, it was intended to plan the unit as a temporary dwelling for a young family and was not planned for grown families. Especially the lack of a storage space and a small bedroom of 4.5 Tatami mats were critical weak points. In spite of the faults the main housing policy at the time was to increase the quantity: number of the house rather than the quality of the house until the early 70s.



Fig.2 Unit plan (1950s-'60s) (figures quoted from ref.1,2)

3 Standard Unit Plan (1960s)

It is a quite effective way for distributing a large number of units to standardize the unit plan. The JHC designed many well-planned units that influenced the local housing all over Japan. In the 1960s, Japan attained a

remarkable economic growth and kept a high growth rate until the 80s. Accompanied by the growth, not only major cities but also every local town experienced a population growth and lack of housing. Most local housing authorities have copied the JHC housing units to respond to the rapid growth and the lack of experienced architects for developing housing projects.

There were three important factors for planning a comfortable unit at the time. The first factor was to get direct sun light in winter when the sun angle is low and the second was to get a fresh air inside even at night and the third was to secure privacy from a common corridor or staircase.

For the first factor, that is to be one of Japanese main living customs, DK or LDK were planned in southern side, and the ratio of the building height and distance was about 1:2 when the building has an east-west axis.

As for the second and the third factors many unit types were planned containing a common staircase between units as a walk-up housing that is applied to under 5 story building without an elevator. The staircase type housing is popular in Japan because of the ample fresh air by cross ventilation and privacy at night.

Apart from the staircase type, a maisonette type was introduced to resolve the problems. The unit type consists of 2 floors connected by an indoor staircase. The access floor has a public space such as LDK and the other floor has bedrooms where there is no problem in terms of both visual and sound invasions caused by a common corridor. And more the maisonette type has an advantage of the efficiency of an elevator that does not stop at each floor but stops at each access floor only.

As for the size of the unit, the 2DK unit, most of the floor area was less than 50 m², has been increased gradually, adding one more bedroom in the 60s and then enlarging the DK including a living room as LDK in the 70s when the housing policy changed from quantity to quality. The standard size of the 3LDK has been established as about 70-80 m² during the time and also the 4LDK unit of about 100 m². All these standard types have been succeeded till the present.

The n-LDK classification system and the standard sizes have become popular not only among public housing market but also among private developers' market that is the major housing market in Japan. It is remarkable that the JHC has influenced the Japanese total housing market in terms of the planning methods.

4. Large scale and high density housing (1970s)

Accompanied by the nation's economic growth in the 60s and 70s, the land price has been increased dramatically all over Japan especially in major cities, which growth attracted young working power to the cities more and more, then the JHC had to develop new methods for large scale and high density housing projects.

One of the major large scale projects is called the Tama new town project that locates in the west suburb of Tokyo taking 1 hour train from the center of Tokyo. It opened in 1971 and the present population is about 150,000 in the project site of 29 km². At the same period in 1972, a famous high density housing called the Takashimadaira housing has opened at the fringe of the central Tokyo. It was an early project of high density housing containing high rise building of 11-14 story and it was the first experience for the residents to live in. The project has the population of over 50,000 in 3.3 km². And the net population density is about 1,000 per hectare that was a remarkable number ever planned in Japan and later the enormous density caused a serious problem in terms of the mental health.

The conventional housing method for under the net population of 400 per hectare was to layout buildings in east-west axes, but it was not applicable for over 800 per hectare. Then the JHC planned the building layout in a south-north axis that enabled to increase the density dramatically. In order to increase the density, architects gave less priority to getting direct sunlight for 4 hours in winter that was a standard in the 60s, and they secured the sunlight in the morning or in the afternoon. Later, by high housing demands in the central areas of cities, new housing units appeared eliminating direct sunlight for the main front facing the north when they plan tall buildings surrounded by an ample open space.

On the other hand, some practical renovations were accomplished by connecting old small units together and secured a sufficient unit size. At the planning stage of the early unit type in the 50s, the architects had understood that the unit could not stand for long term living and they left a possibility to connect the next unit by removing a wall among the units.

5. Three generation family unit plan (1980s)

Until the middle of the 70s, it was shared by most of the people commonly that to live in a detached house with a garden in a suburb was the goal of their life and many of them have made effort to prepare a housing budget as much as possible by moving according to their life stages, for an example starting from a small rental apartment for a young couple and then to a 2LDK unit for a nuclear family and so on. But then after, it has become difficult or impossible for most of the working middle class in major cities because of the excessive high land price of the suburb, and they gave up the goal and changed the goal to live in a multiple dwelling unit, if possible with their young family.

Following the housing policy change in the 70s, the JHC developed large units as mentioned before and also developed unit plans suitable for long-term living. The architects adopted a useful concept of a life-stage for the adaptable plan that enables the long-term living. The life stage of a family changes as the family members grow and the needs of space changes accordingly. In order to meet with the need of each stage, the water section including kitchen, bath and toilet is fixed at first and the other space is left flexible to divide by light walls or furniture. Some of the experimental units were designed by a skeleton-infill system that provides the structure and the water section first and installs the interior space according to the needs of the residents.

In the 80s, demanded for a larger size unit has increased among city dwellers who plan to live with their parents who live remote from the young family. In the period, social infrastructure and welfare service became improved and the city dweller enjoyed their urban life and it caused a serious population gap between cities and local areas and the young generation is reluctant to return to their hometowns. Then the larger size unit has drawn attention among them.

For the three generation living, it is needed to secure the unit floor at least 100 m² in order to separate the elder generation's activity partially from the younger generations. The unit needs more improvement to get fresh air and sunlight into each room from outside. Generally, a row house type 3LDK unit has 2 rooms in front and a center cored water section inside. And adding more rooms to the unit without some devices will make a blind room in the unit. Then the architects resolved the problem by installing a light-well in the center of the unit. The light well is a large vertical shaft useful for indoor ventilation and natural lighting inside.



Fig.3 Unit plan (1970s-) (figures quoted from ref.1-3)

6. Post n-LDK plan (1990s-)

The n-LDK unit system is useful for housing market to indicate the unit plan clearly and became a common naming in Japan while overseas market use n-bedroom type system. In the original concept of the n-LDK, a standard nuclear family was thought to use LDK for common living and bedrooms for private use, but the reality is sometimes different from the concept. There is a variety of space use in each family especially in the family that has a youth generation whose activity pattern is different from the parents and sometimes complicated. Also as the rapid coming of the aging society with a low birth rate in the 00s, it became necessary to live in urban areas together with the elders who live in the country.

By the research of the residents' behavior, it has been recognized that the n-LDK unit plan does not necessarily meet with residents' needs totally. And some attempts were made following the research and unique unit types were introduced by adding another living space, a study adjacent to a bedroom, a multiuse room, another access and so on.

And more, the work style of the people has changed by the wide spread of 24 hours working by day and night shifts and of the information technology (IT) and the information and communication technology (ICT) that enable working at home. Especially in the 21st century, when the performances of the computer and the Internet technology have been improved dramatically, work style of the people has been changed rapidly. Some office workers are not necessarily bound to their office during their working time and can work at home either. And someone can work at home in a small room assisted by the Internet communication.

With the growth of such work style, the SOHO housing has been introduced in Tokyo. SOHO means small office home office and run by an individual generally. One of the forerunners of the housing was constructed in the bay area of Tokyo where has a good advantage of traffic access to everywhere. The project is called the Shinonome Canal Court CODAN completed in 2003-2005 with a collaboration of well-known architects offices.

The characteristic of the SOHO housing unit can be seen in the access space layout. Each unit has a small entrance space that can be used as a small office or shop being open visually to visitors and neighbors. And the access space is facing to an open common space in the corridor for the community. The planning method has a potential of spreading the life-style and adapting to a variety of the residents' needs.

7. Conclusion

In the history of 60 years, the Japanese public housing has developed the characteristics of the unit plan in each period according to the government policy and the public needs and these have influenced strongly in terms of the spread of the planning method over the country. The needs have been magnified with the development of the nation's economy and enriched the standard of living life. With the growth of the society, new problems have appeared to improve the quality of the unit plan. It has been effective to standardize the unit plan for mass production but it is needed to improve the unit according to the change of life-style after achieving the quantity of housing.

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