

Author Posting. (c) 'Taylor & Francis', 2009.

This is the author's version of the work. It is posted here by permission of Taylor & Francis for personal use, not for redistribution.

The definitive version was published in Journal of Engineering Design, Vol. 21, No. 2&3, April 2010, 165-171.

doi:10.1080/09544820903310683 (<http://dx.doi.org/10.1080/09544820903310683>)

How can the exploding senior population be accommodated?: Japanese struggle toward inclusive design

Satoshi Kose

Graduate School of Design, Shizuoka University of Art and Culture, Hamamatsu, Japan

It was the mid 1980s when Japan was told that it will become a highly aged society in the years to come. To cope with the rapid change, a research and development project was conducted with government funding, followed by policy implementation of several kinds, in particular the proposal of dwelling design concepts acceptable in people's later years. The paper attempts to report progress, and discusses the remaining issues to be resolved to bring about an inclusive society.

Keywords: design for ageing, dwellings, housing policy, universal design.

Introduction

Japan has become one of the most aged societies in the world. The most recent estimate is that more than a quarter of the whole population in Japan will be 65 and over in 2013, and the increase will continue to reach a much higher level, i.e., 40 % of the whole population may be 65 and over in 2055(Kaneko, et al, 2008). It means that previous assumptions of care of the aged by their family members, or care in special institutions for the aged have ceased to be valid as a major measure. Minimum barrier-free physical environments are essential to avoid difficulties during daily living. After all, dwelling is the basis of people's life, and disability (particularly age-related disability) should not adversely affect people.

The change of people's attitudes has not happened suddenly, however. When the author started discussion in the mid 1980s, even the majority of researchers in dwelling design thought that senior specific housing would suffice (Note 1).

In 1986, estimate by the government announced that Japan will have a quarter of its population aged 65 and over around 2030 as a peak (National Research Institute for Population Problems, 1986). Government ministries quickly responded to this news, and asked for budgets to implement policy measures to cope with

the situation that is expected to arrive. Being responsible for preparing the built environment for the future, the Ministry of Construction started a five-year research and development project on design for the aged society in 1987. The author, as a researcher at the Building Research Institute affiliated with the Ministry, took the leading role in defining the aim of the project, and put “design for all ages” as the key concept, discarding the traditional idea of special design for the aged. During the project term, the author tried to find out the realities of healthy ageing in the community, and to propose possible design features that will enable the ageing in place of seniors in their own dwellings. For reference, housing policies for the aged in different countries (including Japan) can be found in Brink (1998).

Research and development efforts

During the development stages, the author tried to integrate existing knowledge with new ideas derived from own surveys and experiments.

To grasp the realities of seniors living in their own dwelling units, a survey was conducted among the senior residents of detached two-storied houses in the greater Tokyo area. The survey asked questions on the characteristics of residents (both younger and senior) including their walking capabilities, dwelling design features and problems encountered in their daily living such as hardship in use and accidental injuries. It was particularly important because what we know within our environs is quite different from what mass media repeatedly report of frail seniors and seniors with dementia: that they are the majority.

Another set of surveys aimed to record the relation of residents to state-of-the-art of senior specific housing and its design features. Detailed results of these surveys have been reported already (Kose, 1992; Kose, Ohta, Tanaka & Watanabe, 1992; Kose, 1994).

A few key findings are: Seniors living in their own dwellings with their younger family members (as an extended family) are relatively healthy but experiencing difficulties in use due to inappropriate designs; some of such features pose an accident risk for everyone but particularly for seniors as they get older; and there are several features needing improvement for more livable dwelling design.

Several experimental studies were conducted as well to establish data to determine a basis for dimensional requirements, including handrail position (Kose, Sugimoto & Goto, 1991) or handrail dimension (Kose et al. 1990).

Basic concepts for design of dwellings for the ageing society that the author finally adopted are:

- 1) The dwellings should be livable 30 years after they are built. This is a clear departure from the previous assumption that people will rebuild their own house in around 30 years.
- 2) Safety, comfort, and usability must be ensured for all residents. The minimum requirements of the Japanese Building Standard Law did not include any consideration of seniors or people with disabilities.
- 3) The required level should not be too high to be universal (since the intention was housing not purpose-built but for generic residents). Affordability must be considered as well.
- 4) Dwellings should be adaptable to meet new requirements in response to changing needs. Flexibility in design was incorporated in the older days, but has not been given due consideration in recent years, particularly for modern reinforced concrete structures.
- 5) Design and facilities should be negotiable depending on the needs of the residents. Diversity of users has

to be considered.

In order to put the above concepts in practice, the following criteria were thought to be necessary:

- 1) Safety of the residents (no tripping risk on floors, etc.).
- 2) Physical support for negotiation (such as handrails).
- 3) Potential for single floor living (as opposed to stair use).
- 4) Circulation for assisted wheelchair (negotiable width for corridors and doors).

The above can be interpreted as follows in terms of design:

- 1) Basically flat floor. No door sills, no step differences, unless vitally necessary.
- 2) Handrail installation at critical places, such as stairs, bathroom, toilet, and entrances.
- 3) Wider corridors and doors.
- 4) Gentler stairs with handrails (The Building Standard Law did not require installation of handrails on walls, but without handrails there is nothing seniors can grasp).
- 5) Adoption of negotiable design features, such as door handles, water controls, electrical outlets, etc.
- 6) Preparedness for emergencies.

Some of the required design details have been modified since the author published previous reports (Kose, 1997; Kose, 2001b), but the basic ideas remain the same (and some compromises that should have been rectified still remain: most notable being the acceptance of a step between the clothing area and bathroom, which has been eliminated in standard private sector dwelling design).

Design guidelines and their implementation

The draft design guidelines were prepared in 1992 when the project term was completed. The draft guidelines to be applied for public housing, compiled in 1991 as an interim report, were used by the Ministry of Construction to guide local governments when they build public housing. The final version was issued by the Ministry in June 1995 as two separate documents, one being issued by the Director-General of the Housing Bureau of the Ministry of Construction, the other by the Director of the Housing Construction and Improvement Division, the latter giving more of the details. The final Guidelines were based on discussions of effectiveness, design and economic feasibility, climatic conditions, and cultural tradition. Most countries have given due consideration to feasibility, climatic and cultural tradition when accessibility requirements were introduced, and Japan took the similar route as it was assumed to be more effective.

The issuance of “Design Guidelines for Dwellings for the Ageing Society” follows the introduction of the “Act on Accessible and Usable Buildings for the Aged and Physically Disabled Persons” established in 1994. These are similar to the Fair Housing Amendment Act (FHAA) and Americans with Disabilities Act (ADA) Guidelines in the States, and this Japanese Act and the Guidelines, put together, would allow ageing residents to live, go out and move around in the community. It is a clear departure from the age segregation that has been the idea of sheltered (or age specific) housing schemes. It assumes that residents will age in place, and that the dwellings should be able to respond to the changing needs of the residents.

Just to issue guidelines does not ensure they are put into practice, however. For this, there was a strong mechanism for implementation in Japan. It has long had the Japan Housing Loan Corporation (HLC), a

government organization for housing mortgages, established in 1950. This has given prospective clients lower interest rates for housing mortgages, and has been a driving force of Japan's economic growth. The Corporation took a decisive step to ask barrier-free or energy conscious design to be eligible for lowest interest rates, starting the fiscal year 1996. The move was coupled with a similar scheme from the National Pension Housing Fund, a public organization affiliated with the Ministry of Health and Welfare. Along with the issuance of Guidelines, consumer education was also carried out through various measures. These new moves have been expected to promote construction of barrier-free dwellings, so that the majority of newer dwellings would be basically barrier-free in the long run (for more discussion from the viewpoint of housing policy, see Kose, 1996). Regarding photo examples of an actually constructed house please refer to other papers (Kose, 1997; Kose, 2001a).

We have enough evidence that newer dwelling design is well accepted by the residents in general terms (Kose & Tanaka, 1998) as well as when comparing older models with newer ones (Kose, et. al, 1999). Therefore, it can be said that the introduction of the guidelines was a success.

Now, more than ten years on, what is the situation, and what needs to be done to further the trend toward a fulfilling life in ones' later years?

Current situation of dwelling design for the ageing society

When the Housing Loan Corporation of Japan (HLC) introduced the new scheme of preferential interest rates in 1996, which required that either design for aging, energy conscious design or high durability design must be met, all the major providers of housing, mostly manufactured e.g. prefabricated or light frame (i.e., 2x4) construction houses, changed their design standards to meet the new requirements (see Note 2). The actual percentage of HLC housing mortgage usage related to design for aging increased to more than 60 %, and Japanese residents seemed to accept the concept of designing for ones' future self as far as dwellings are concerned.

The move was later followed by the introduction of a housing performance indication system in 2000, based on the Housing Quality Assurance Law. Design for ageing was included among the categories in the system (Kose, 2003). The system covers 10 areas, i.e., structural safety, fire safety, durability, ease of maintenance, thermal, air quality, lighting and visual, sound, ageing, and crime prevention. The performance levels will be ranked.

Although the performance indication system is not mandatory, it is now gaining popularity because the trend is toward obtaining a long lasting dwelling rather than moving from one dwelling to another. In the past, people have assumed they would change their place of living from student bedsitting to an apartment to a dwelling unit in multifamily housing, and finally settle down in a detached house in the suburbs. However, there is a tendency now to settle down in a condo unit. Whatever the case they realize that keeping the property value in the long run is worthwhile, and higher housing quality will be more appreciated.

The statistics show that, in 2004, around 3500 dwelling units of detached houses and 10,000 dwelling units of multi-family housing construction are obtaining housing quality certificates every month as they are built. This means that the majority of newly built dwellings are still without certificates (roughly one million dwelling units are built in Japan every year), but the tendency is that multi-family housing units are more likely to apply for certificates. As of October 2008, around 271,000 detached houses and 551,000 dwelling units of multi-family housing have obtained the certificate.

A certification system for existing dwellings was introduced in December 2002, but very small numbers of dwellings have applied so far (127 detached houses and 89 multi-family dwelling units until March 2004, and as of October 2008, they are 576 and 1,225, respectively). It is partly because of cost versus benefit, and partly because of the risk of poorer quality becoming evident, which will lead to a fall in the market value of the dwelling as a real estate property, particularly for multi-family units. It is what the owners of other units do not want to happen.

The numbers of dwellings with certificates are only a small proportion since the total number of dwelling units was roughly 47 million (according to the Housing and Land Survey conducted in 2003), and we still have to wait for the system to gain momentum.

Another law introduced in 2001 was a Law on Securing Housing for Seniors, whose primary target was to invite the private rental sector into the housing market. The Design Guidelines for Dwellings for the Aged, a revised version of the Design Guidelines of 1995, now became more formal than before because the guidelines are designated as an official document based on the law.

The introduction of this new law was necessary because it is now impossible to accommodate all the seniors who wish to rent a dwelling in public sector housing, which was assumed to be the norm. The law introduced several economic benefits for private rental housing provision, from subsidies for construction to guaranteeing the rents of seniors even in case of difficulty. Simply put, it is a change of emphasis from direct housing provision by local governments to attracting private sector provision.

Whether this works effectively or not is yet to be seen because constructing new higher quality dwelling units targeted toward seniors could involve a large amount of investment by the private sector. Existing dwelling units are generally too poor quality and normally cost a lot to modify so that the government may experience difficulties until good quality dwellings become routine for new construction. For private banks that provide housing mortgages, higher quality housing is favorable as well, and this is expected to accelerate the trend toward design for ageing.

Regarding the official dwelling design guidelines for the aged, the content is quite similar to the previous design guidelines for the ageing society, which means that the contents of the guidelines are acceptable as the standard for all dwellings.

Is there a policy link with the care for the aged insurance system?

From April 2000, an insurance system that will cover every senior citizen (in case of need) was introduced. It is under the control of the Ministry of Health, Welfare and Labor, and was originally designed to assist seniors to age-in-place. Once an older person is certified to be in need of support due to frailty from aging, he/she is entitled to be supported in various ways, both physically and financially. However, the maximum amount one can get to modify a dwelling is two hundred thousand yen, which is roughly two thousand US dollars. Experience shows that the amount will only allow installation of handrails or something of a similar kind. Therefore, the system in reality denied effective home modification to support seniors in continuing to age-in-place.

The system instead allows quite a variety of assistive devices to be used (mostly on rental), but is also generous with human-powered assistance since the monthly cost to be covered for the above two items is of the same order as the maximum amount for home modification, which is once-in-a-lifetime. It seems that the Finance Ministry has a deep-rooted belief that housing provision should be made by individuals and that assisting them with public money is social injustice, which is a rather different view from other western countries' perception of housing, where the consensus is that dwellings will last longer than the residents.

If aging-in-place is to be pursued despite of such difficulties, we must take into consideration that the residents' capabilities can vary quite extensively in the course of time. The official design guidelines on dwellings for the aged (and the HLC housing mortgage requirements) emphasized basically only the following three requirements, i.e., floor without unnecessary difference in level, support for handrail installation, and width of crucial spaces. The most recent result of the Housing and Land Survey conducted in 2003 revealed the following picture: among the whole housing stock, only 5.4% satisfy the three requirements, and even among those units where seniors reside, only 6.7% satisfy the same requirements. The situation is worse with rental units than owner occupied.

These three conditions are not enough once the residents became frailer. However, experience tells that in most cases additional arrangements can be made if the three conditions are provided in advance (Kose et al. 1999). Many of the difficulties encountered in the dwellings of the current frail seniors who wanted to be covered by the long-term care insurance system were related to the lack of the above three conditions, partly due to their dwellings being very old (Kose & Tanaka, 2000). If the residents might have or develop severe disabilities, provisions to support their living in the dwellings (i.e., age-in-place) will have to be extensive and in some cases need particular made-to-order solutions rather than generic, even if the dwellings are designed to match the aging of the residents. In many cases, however, the residents will be able to grow older in place without too many problems as the survey shows (Kose & Tanaka, 1998).

Who needs to be accommodated after all?

Of course, the baseline of Japanese design guidelines is far from desirable. If we want to keep as many seniors as possible in their own dwellings as opposed to trying to accommodate them in special facilities and hospitals, we need higher dwelling design standards. What have to be included in the future are: stricter requirements on stair dimensions (shallower and wider), more circulation width, and solutions to changes of level between outside and inside. The last issue is most difficult under climatic conditions of driving rain, and sophisticated methods of design and construction are necessary, particularly for detached houses.

In the global context, several facts are worth mentioning. In the UK (England and Wales), Approved Document Part M: Access and Facilities for Disabled People (1999 edition) requires that new residential construction has to be accessible and usable on the ground floor (to include a bathroom on the ground floor), and more recent Approved Document Part M 2004 edition has a new title "Access to and use of buildings," indicating the new concept of inclusive design rather than barrier-free design. The visitability concept was originally introduced in the US (Atlanta, Georgia) in the late 1980s, and some local governments are trying to include the concept as a requirement for new housing construction. The concept and the word "visitability" are not yet familiar to the Japanese since it has not been all that popular for people with disabilities to visit friends and relatives: they have simply accepted that the environment is too adverse to be overcome. Generally, the younger generations' dwellings are becoming far more visitable than those of the seniors, but the hardships of travel have prevented seniors from visiting their children's dwellings. With the introduction of the Accessible and Usable Transportation Act in 2000, such hardships are now steadily being removed. There however remain difficulties of access at the boundary of the property, at the entrance door, as well as the toilet space inside the dwelling (although a toilet is typically located on the ground floor in Japan).

Conclusion: towards the future

Earlier dwellings are worse in terms of barrier-free design compared to newer ones. In addition, aged persons who are more vulnerable and experiencing difficulties in their daily living tend to live in sub-standard dwellings that are full of barriers. To solve the problem, intervention at an earlier stage is desirable.

Currently, there are few schemes that allow dwelling remodelling before residents develop difficulties or experience accidents during their daily activities. It is however necessary, from the viewpoint of ensuring Quality of Life (QOL) for aged persons, to introduce a new scheme of financial assistance for remodelling. All we have now is a loan scheme from the Japan Housing Finance Agency (the successor to HLC) or others of a similar kind, but unfortunately such loan schemes lack economic incentives for the aged residents even with some tax rebate. It is however certain that Japan will experience trouble unless it manages to upgrade the quality of existing dwellings in a more effective way.

Notes

1. The year 1987 was actually the first year when a senior specific housing scheme was officially introduced in Japan, which followed the idea of sheltered housing in the UK. In retrospect, we can tell that the speed of population structure change was too rapid to introduce and manage senior specific housing as a generic solution to the housing problems of seniors.
2. Although design for ageing requirements did not lead to any serious problems, energy conscious design did. The simplest measure to meet energy saving requirement was to make the dwelling tight enough to prevent air from leaking, but it resulted in the so-called sick-house syndrome. Volatile organic contaminants (VOCs) were retained within the dwelling, causing allergic symptoms in those who are sensitive to these gases whether building related or product originated. To mitigate the problem, all dwellings are now legally required to have a 24-hour continuous ventilation system.

References

- Brink, S. (Ed), 1998. *Housing Older People: An International Perspective*. New Brunswick, NJ: Transaction Publishers.
- Department of the Environment, Transport and the Regions, 1998. *Approved document Part M: Access and Facilities for Disabled People; 1999 Edition (The Building Regulations)*. London, UK: The Stationery Office.
- Kaneko, R. et al., 2008. Population Projections for Japan: 2006-2055: Outline of Results, Methods, and Assumptions. *The Japanese Journal of Population*, 6 (1), 76-114.
- Kose, S., 1992. Capability of Daily Living of the Elderly and Their Accident Experiences: Implication to Design of Safer, Easier-to-Use Dwellings. In *Equitable and Sustainable Habitats - Proceedings of EDRA23*. Oklahoma City, OK: EDRA, 158-166.
- Kose, S., 1994. Housing for the Ageing Society: The Meaning of Barrier-free Design in Japan. *MERA Journal*, 2(1), 59-64.
- Kose, S., 1996. Possibilities for Change toward Universal Design: Japanese Housing Policy for Seniors at the Crossroads. *Journal of Aging and Social Policy*, 8(2&3), 161-176.
- Kose, S., 1997. Dwelling Design Guidelines for Accessibility in the Aging Society: A New Era in Japan? In Wapner S. et al, Eds., *Handbook of Japan-US Environment Behavior Research: Toward a*

Transactional Approach. New York: Plenum, 25-42.

- Kose, S., 2001a. The Impact of Aging on Japanese Accessibility Standards. *In*: Preiser W. and Ostroff E. (Eds.), *Universal Design Handbook*. New York: McGraw-Hill, 17.1-17.12.
- Kose, S., 2001b. Design Guidelines of Dwellings for the Ageing Society: Japanese Approach Toward Universal Design. *In CIB World Building Congress 2001 Proceedings*, Wellington, NZ.
- Kose, S., 2003. The Japanese experience. *Inclusive Design: Design for the whole population*. London: Springer, 308-316.
- Kose, S., 2006. Universal Design of Dwellings: Who are the assumed residents? *Gerontechnology*, 5 (3), 170-173.
- Kose, S., Ohta, A., Tanaka, Y. & Watanabe, K., 1992. Examination of Design Effectiveness of Special Housing for the Aged: Is Japanese "Silver-Housing" a Success? *In Socio-Environmental Metamorphosis - Proceedings of IAPS12*. Vol. 3. 161-166.
- Kose, S., Kumano, I. & Matsuzaki, A., 1999. How Far Has the Design of Dwellings Improved in These Ten Years?: Comparison of Two Groups of Houses from the Viewpoint of Design for the Ageing Society. *In The Power of Imagination - Proceedings of EDRA30*. EDRA, Edmond, OK, 127-132.
- Kose, S., Sugimoto, Y. & Goto, Y., 1991. Acceptable Handrail Position for Use by the Elderly. *In Designing for Everyone - Proceedings of the Eleventh Congress of the International Ergonomics Association*, 1116-1118.
- Kose, S., Sugimoto, Y., Goto, Y. & Konishi, T., 1990. Handrail Requirements for Use by the Elderly: Part 2. Allowable diameter and necessary clearance from the wall. *In Summaries of Technical Papers of 1990 Annual Meeting of the Architectural Institute of Japan, Architectural Planning*, 697-698. (In Japanese)
- Kose, S., & Tanaka, Y., 1998. The New Design Guidelines for Dwellings Toward the Ageing Society: How Are They Accepted by the Residents? *In People, Places and Public Policy - Proceedings of EDRA29*. EDRA, Edmond, OK. 53-56.
- Kose, S. and Tanaka, Y., 2000. *Dwelling Design for Seniors with Safety and Comfort in Mind*. Tokyo: Ohmsha. (In Japanese)
- Statistics Bureau, Ministry of Internal Affairs and Communications. 2004. Housing and Land Survey. <http://www.stat.go.jp/english/data/jyutaku/index.htm> (Viewed 2009.02.24).
- National Research Institute for Population Problems, 1986. *1986 Population Forecast*.