Management Plan for the Reduction of Apartment Noise

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ABSTRACT

In South Korea, the ratio of residents who live in multi-housing such as apartments is about 71% and it is significantly higher than in other countries. For this reason, the conflicts are very common in the Korea. It has emerged as one of the major social problems, causing murder cases over the past few years. The flooring defect is considered to be the first reason, but the primary reasons are growing individualism and lack of understanding between residents. If conflicts arise due to apartment noise, there are no standard for residents living noise in Korea. Furthermore, there is no systematic plan for managing effectively the apartment noise.

This study identifies the current state of the apartment noise and propose an effective management plan to reduce the apartment noise.

1. INTRODUCTION

Result of housing census 2010 in Korea, the ratio of residents living in apartment is about 71% nationwide and this is significantly higher than foreign country. There’s no legislation to restrict the apartment noise although complaints related to the noise have been growing due to carelessness of residents and structural defects. It has become a major problem and murder cases involving apartment noise have occurred in recent years in Korea.

2. CURRENT STATE OF APARTMENT NOISE

2.1 Korea

It was divided the reason of apartment noise into the structural defects of the apartment building and the carelessness of residents.

More than half of apartment noise cause is responsible for the construction company because of the bad flooring and wall condition. The government established standard for floor impact sound. According to this provision, light weight Impact noise is ensured less than 58dB, heavy weight impact noise is ensured less than 50dB and thickness of the bottom was required to strengthen to 210mm from 180mm. However, this provision is capable of construction be satisfied by one of the reference and thickness floor impact sound performance, it is not effective in the reduction apartment noise and tends to increase related complaints. The government plans to target a new apartment from 2014 years, to strengthen the structural criteria of the floor to satisfy of the ‘thickness’ and ‘performance’ of the floor. It also decided to introduce the construction methods Column type-structure (transmitting the force

through the floor, beams, pillars) with excellent sound insulation performance an apartment by public agencies such as the Korea Land and Housing Corporation to construction from next year, and then plan to actively promote offer incentive (volume ratio, tax benefits) and Research & Development to industry for the Column type-structure activation.

In fact, the main cause of complaints for the apartment noise comes from the lack of community spirit of the residents. According to a recent study by the Environment Ministry, 73 percent of complaints about noise from neighbor’s homes involved children running or people walking noisily, followed by noise from laundry or cleaning machines and flushing toilets, dragging furniture or playing musical instruments (Figure 1).

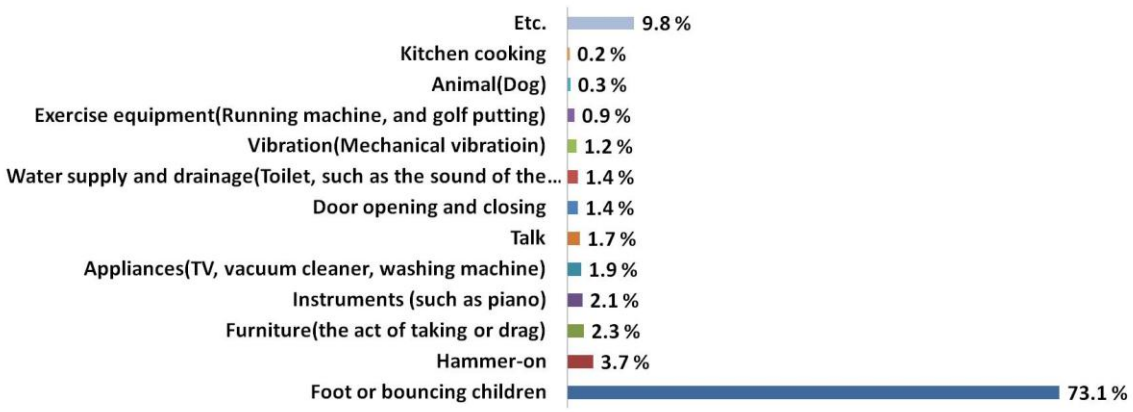

Figure 1: Causes of the apartment noise in Korea (2012)

The standard of apartment administration agreement is determined on the basis of the Housing Act, which specifies matters relating to the apartment noise. However, it is not sufficient because that is only presenting some principles, do not present a specific method and criteria. Recently, the government has to embody the contents that can prevent the noise in housing life including the apartment noise, and then reflect the general standard of apartment administration agreement. In particular, prohibited acts according to the time zone and the type of apartment noise are expected to be included.

Government has opened the ‘Apartment noise Center’ in 2012 in order to adjust dispute over the apartment noise. The center provide helpline by expert and measurement of field noise in order to induced the understanding and conflict resolution between the parties about complaints regarding the apartment noise.

According to the number of the complaint about apartment noise, it was 7021 by the end of last year. It was 20 times or more as compared to the year 2011 until open the ‘Apartment noise center’. Currently, the ‘apartment noise center’ has received the application living in residents in the metropolitan area, and plans to expand across the whole country.

In recent years, the government strengthened the damage certification standards of the apartment noise and newly established standard of maximum noise level (Table 1).

Table 1: Damage certification standards of the apartment noise in Korea

Time zone	Standards		Measuring time		Establishment (Maximum)
	Before	After	Before	After	
Day	55dB(A)	40 dB(A)	5min	1min	55 dB(A)
Night	45dB(A)	35 dB(A)			50 dB(A)

Day-time: 06:00~22:00, Night-time: 22:00~06:00

Therefore the damage would be admitted even 55.0dB(A) noise even occur once in a daytime. Maximum daytime standard is the noise level of the degree that occurs when you drop a 1.5L plastic bottle, as shown in Figure 2.

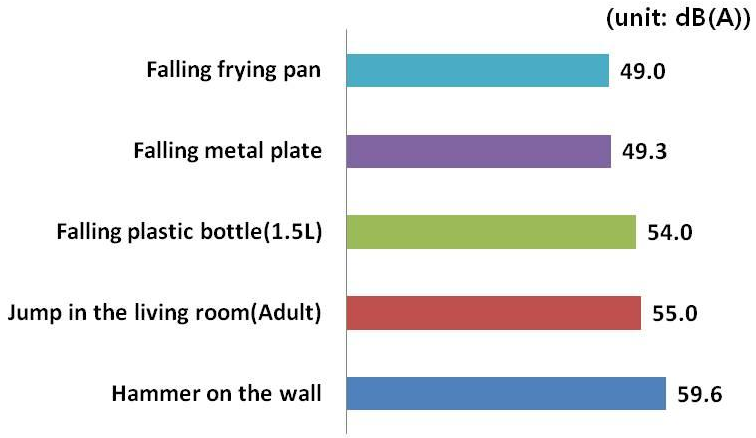

Figure 2: Noise level of each apartment noise type

2.2 Standard of Interior noise

Noise standards for multi housing of advanced countries are more severe to Korea. In this paper, we examined and compared with us for the interior noise standard of the World Health Organization (WHO) and Australia.

WHO has proposed a guideline of the environmental noise in 1999 (Table 2). It is presented as well as Equivalent noise and Maximum noise level.

Table 2: Guideline values for community noise in specific environments

Specific environment	Critical health effect(s)	L_{Aeq} [dB(A)]	Time base [hours]	$L_{A\max}$ fast [dB]
Dwelling, indoors	Speech intelligibility & moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance , night-time	30	8	45

The standards for environmental noise control of the WHO, by one that is severe as in the above table, specified at day a living room less than 35dB(A) and night a

bedroom 30dB(A) for continuous measurement 5 minutes. In particular, at night, it defines the Maximum noise level that can affect disturbed sleep.

Table 3 shows the noise standard of living space within the stipulated in the Environmental Protection Act of Australia. Presents the criteria of time zone and another building, for the apartment building, it is prescribed as low as 30dB(A), 40dB(A) each day and night. In particular, it prohibits the operation of the equipment to reflect the characteristics of Australia.

Table 3: Environment protection act, 1997

- Residential Area

Section	Common building	Apartment building	Notes
Day	45dB(A)	40dB(A)	07:00~22:00 (Sunday, public holiday 08:00~22:00)
Night	35 dB(A)	30 dB(A)	22:00~07:00 (Sunday, public holiday 22:00~08:00)

- Regulations: Residential noise

Group	Prohibitions	Time-zone
3	Operation of equipment (Air conditioning and vacuum cleaner, etc.)	Mon. ~ Fri. : 22:00~07:00 Weekend, Public Holiday: 22:00~09:00
4	Playing musical instruments, Generate sound (Radio, stereo, etc.)	Mon. ~ Thur. : 22:00~07:00, Fri : 23:00~07:00 Sat., Public Holiday : 23:00~09:00 Sun. : 22:00~09:00

2.3 Standard of Floor Impact Sound

Standards of Floor Impact Sound in foreign countries are severe as compared to the Korean standard (Table 4). There are only Japan and Korea that have defined the heavy weight-floor impact sound because of Asians' sedentary lifestyle. But it is not enforcement provision but recommended standard in Japan.

Table 4: Comparison of floor impact sound standards

Section	Standard	Mandatory /Recommend	Light Weight -Floor Impact Sound	Heavy Weight -Floor Impact Sound
Korea	Provisions on housing construction standards, etc.	Mandatory	Below 58dB	Below 50 dB
Germany	DIN 4109	Recommend	Less than 53dB(A)	-
Japan	Housing Quality Assurance Law for Promotion (Grade IV)	Recommend	Less than 50 dB(L)	Less than 55dB(L)
USA	Housing and Urban Development (Grade III)	Recommend	Living and bedroom 48~55	-

There's no distinction heavy and light weight-floor impact sound in Europe because they wear shoes in the room. Criteria are lower than the level or rather are similar to Korea (Austria 43~50dB, such as Germany and Norway and Finland 53dB).

2.4 Penalty on noise

If complaints about the apartment noise occur, the management office can warn three times, and then it happens again, office can deport the resident without exception in the case of if home ownership in the many states of USA. Also, in New York, it is basically prescribed to prevent making noise what interfere with the others' lives (Table 5).

Table 5: Noise penalty schedule (NYC)

Description	Violation Offense	Penalty	Default	Stipulation
Causing or permitting unreasonable noise (7AM to 10PM)	1st	$350	$1,000	Y
	2nd	$700	$2,000	Y
	3rd	$1,050	$3,000	N
Causing or permitting unreasonable noise (10PM to 7AM)	1st	$450	$1,000	Y
	2nd	$900	$2,000	Y
	3rd	$1,350	$3,000	N

In Germany, it offers a powerful regulation to prevent the dispute about apartment noise. If it can either annoy neighbours and public or emit unwanted noise, will fine up to 10,000 deutschmarks (about 6,000 thousand won).

In the UK, the rules of community life on the noise are clearly defined. If noise damages reporting are accepted, primary will warn the person who caused the noise and then repeat acting, will fine 1,000 pounds (about 1,700 thousand won).

3. MANAGEMENT PLAN FOR THE APARTMENT NOISE

Two considerations to alleviate disputes over the apartment noise are divided into two; physical improvement and post management plan.

3.1 Physical Improvement

Because the apartment noise is transmitted through the structure, regulations on floor should be tightened. Representative regulation items are thickness of floor and reduction performance of floor impact sound (light weight impact sound, heavy weight impact sound). Tightening regulations on floor quality (performance) may be naturally lead construction companies to technology development to reduce the apartment noise.

Furthermore, field test and evaluation standards of floor performance has to be presented clearly in order to apply the strengthen on the floor performance regulation criteria to the noise reduction. It needs the systematic support in order to construction the Column-Type structure will be more effective sound insulation performance than Wall-Type structure, which is used to lower construction expenses.

3.2 Post Management Plan

Post management is more important because the noise problems arise after residents move into the apartments. There are strong regulations or rules for the interior noise in advanced countries such as U.S. But disputes are escalating in Korea because regulations or systematic management plans are not suggested.

Here are the post management plans to alleviate disputes over the apartment noise.

First, life habit improvement of residents has to be preceded before they move into apartments. If their habits are not improved, for example, if kids bang around in their home, it would be impossible to perfectly block the noise in apartments even if the floor is thick enough. For this reason, people should try to improve their habits and educate their children to have better habits. Also, the government has to suggest more specific rules or guidelines for those residents in order to preventing apartment noise.

Second, each local area has to have Apartment Noise Center which controls conflicts among them. The center will need to check the problem in real time and lead the residents to have better understanding of each other or neighbors. In addition, it needs to develop the Smartphone apps that simply measure the apartment noise level. Reliability may be differ depending on specifications of the Smartphone but it is considered to be meaningful objective measurement tools for the apartment noise.

Third, the developer should announce the apartment noise reduction rating to potential apartment housing residents in advance. They would prefer the house which has a higher apartment noise reduction rating and lower rated one will affect on the sale price. Those who move in the house which has the cheap housing prices and lower rating may aware the problem about apartment noise in advance and this generates less dispute.

Finally, when a mental damage in the apartment noise is recognized, criteria for the compensation should be prepared and construction companies should take a responsibility (deposit, recall, etc.) in structural matters. When a problem takes a place among residents, specific plans with physical compensation should be carried out not to cause the same apartment noise issue.

3.3 Review the necessity of introduction of the environmental impact assessment

The environmental impact assessment is designed to reduce harmful environmental effects by expecting and considering various effects on the environment when the urban development projects are carried out. Currently, no nation has introduced the apartment noise as an item of the environmental impact assessment. However, a nation which has a sedentary lifestyle such as South Korea should examine a necessity on the environmental impact assessment because the apartment noise causes many problems in an interior daily lives. Also, how much apartment noise would be reduced is not ensured even if the floor performance regulation standards are meet. The environmental impact assessment will help us understand the effects of the apartment noise in advance and work effectively on the technology development to reduce the influence of it.

4. CONCLUSION

Korea is one of the nations where dispute about the apartment noise is most frequently arising in the world. In recent years, complaints about the apartment noise are rapidly increasing because of unrealistic regulatory standards and lack of community spirit. In this study, it is investigated the current state of the apartment noise in Korea and the other countries and propose the management plan about the

apartment noise for the purpose of reduction for the noise. In particular, we suggested that physical measurement, management plan and the introduction environmental impact assessment of apartment noise.

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