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THE PRESENT SITUATION AND THE TREND OF STANDARDS AND REGULATIONS FOR SOUND ENVIRONMENT PROTECTION IN JAPAN

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ABSTRACT

Japanese government established environmental quality standards for the sound environment protection based on Article 16, "Basic Environment Law" and regulatory standards which prescribe regulations on noise level at noise sources based on "Noise Regulation Law" according to Article 21 "Basic Environment Law". This paper will describe the present situation and the trend of standards and regulations for the sound environmental protection in Japan.

1 - BASIC ENVIRONMENT LAW AND ENVIRONMENTAL QUALITY STANDARDS**1.1 - Basic environmental law**

The purpose of this law is to comprehensively and systematically promote policies for environment conservation to ensure healthy and cultured living for both the present and future generations of the nation as well as to contribute to the welfare of mankind, through articulating the basic principles, clarifying the responsibilities of the State, local governments, corporations and citizens, and prescribing the basic policy considerations for environmental conservation. The law defines basic principles, responsibilities, basic environmental planning, environmental impact assessment, the promotion of environmental conservation activities, the establishment of environmental quality standards, international cooperation for the conservation of the global environment, cost sharing, and financial measures related to environmental conservation.

1.2 - Relations between "environmental quality standards" and "basic environmental law"

Environmental quality standards are established under Article 16 "Basic Environment Law". Environmental quality standards are "standards that should be maintained to protect human health and conserve the living environment," while attempting to achieve administrative objectives. Separate "Environmental Quality Standards for Noise", "Environmental Quality Standards for Aircraft Noise", and "Environmental Quality Standards for Shinkansen Super Express Railway Noise" have been established. Basic Environment Law, Section 3, Environmental Quality Standards

- Article 16: With respect to air pollution, water pollution, soil pollution, and noise, the Government shall establish standards that should be maintained to protect the health of the people and conserve the living environment.
- Standards in Paragraph 1 must always be subject to proper scientific judgment and necessary revisions.

- The government must carry out the policies established in this chapter that pertain to environmental pollution control (hereinafter referred to as "environmental pollution control policies") in a comprehensive, effective, and proper manner with a view to ensuring the standards in Paragraph 1.

1.3 - Environmental quality standards

Environmental quality standards for noise

In September 1998, the environmental quality standards were revised which was to be enacted in April 1999. The outline of the new environmental quality standards is as follows.

Basic principles in establishing new environmental quality standards

1. Environmental quality standards are defined as acceptable levels of outdoor noise as determined by levels of such noise detected indoors. The levels are to be measured in L_{Aeq} instead of L_{50} .
2. Acceptable outdoor noise values in general residential areas [55 dB (daytime)/45 dB (nighttime)] are determined by estimating the average sound insulation of buildings (10 dB with windows open).
3. Different values should be given to commercial and industrial areas and to roadside areas. These values should be confirmed as being acceptable by referring to findings on community tolerance toward noise.
4. It is difficult to reduce noise in areas where houses are directly exposed to high-level traffic noise. For such limited areas as those adjacent to trunk roads, separate values (70 dB/65 dB) should be considered to promote measures to reduce noise. Compliance to these values mean that standard values of outdoor noise detected indoors in roadside areas (45 dB/40 dB) will be achieved under the condition that roadside houses have average sound insulation (25 dB with windows closed) and that their windows are kept closed.
5. Additionally, standard values of outdoor noise detected indoors (45 dB/40 dB) in such limited areas as those adjacent to trunk roads should be the same value as those for roadside areas. They are valid when windows of the roadside houses are judged as being usually closed and when aiming at improving the sound insulation of houses.

Environmental quality standards for noise

Based on the basic policy mentioned above, new environmental quality standard values in L_{Aeq} have been decided as follows.

The new standards define two time categories: daytime (6:00–22:00) and nighttime (22:00–6:00 the following day). According to differences in land use, four area types (AA, A, B, and C) are defined:

- AA: Areas that especially require a quiet environment, such as those in which convalescent facilities and welfare institutions are concentrated
- A: Areas exclusively for residential use
- B: Areas mainly for residential use
- C: Areas for commercial and industrial use and significant residential use

The following values are given in the notification of the new environmental quality standards for noise.

Area Type	Standard Values	
	Daytime	Nighttime
AA	50 dB or less	40 dB or less
A and B	55 dB or less	45 dB or less
C	60 dB or less	50 dB or less

Table 1: EQS values for general residential areas (L_{Aeq}).

Area Type	Standard values	
	Daytime	Nighttime
A (facing two or more lanes)	60 dB or less	55 dB or less
B (facing two or more lanes) and C (facing one or more lanes)	65 dB or less	60 dB or less

Table 2: EQS values for roadside areas (L_{Aeq}).

Separate standard values for areas adjacent to arterial roads are given below.

Standard Values	
Daytime	Nighttime
70 dB or less	65 dB or less
Note: Standard values for outdoor noise detected indoors (45 dB or less for daytime and 40 dB or less for nighttime) can be used for houses with windows on the sides most affected by the noise judged as being usually closed.	

Table 3.

Environmental quality standards for aircraft noise

Area Category	Standard Value (WECPNL)
I	70 or less
II	75 or less

Table 4.

Notes:

1. Areas in area category I are exclusively for residential use and areas in area category II are where normal living conditions should be conserved.
2. Slow-maximum noise levels of aircraft noise, i.e., aircraft noise levels that are higher than the background noise level by 10 dB or more, should be recorded in decibels (A) for seven consecutive days along with the number of aircraft responsible for such noise.
3. The WECPNL value for each day shall be calculated from Slow-maximum noise levels of aircraft noise and the number of aircraft responsible.

Environmental quality standards for Shinkansen super express railway noise

Area Category	Standard Value (dB)
I	70 or less
II	75 or less

Table 5.

Notes:

1. Areas in area category I are mainly for residential use and areas in area category II, including commercial and industrial areas, are where normal living conditions should be conserved.
2. Slow-maximum noise levels of Shinkansen super express railway noise of 20 consecutive trains passing in both directions should be recorded. Shinkansen railway noise should be evaluated by the energy mean value of the upper half of the measured Slow-maximum noise levels.

2 - NOISE REGULATION LAW

2.1 - Noise regulation law

The purpose of this Law is to conserve the living environment and contribute to the protection of the people's health by regulating noise generated by the operation of factories and other types of work sites

as well as construction work affecting a considerable area and by setting maximum permissible levels of motor vehicle noise (Article 1).

The main contents of this law are as follows.

- Regulations Regarding Specified Factories
- Regulations Regarding Specified Construction Work
- Maximum Permissible Levels of Motor Vehicle Noise
- Requests and Opinions Based on Monitoring

2.2 - Regulations regarding specified factories

"Specified factories" are defined and the values of "regulatory standards" are provided for each of the four area types and for each time category (daytime, morning/evening, and nighttime).

The following procedures are specified for the measurement of noise.

1. When the indicated level by a sound-level meter fluctuates slightly, the indicated value is to be read.
2. When the indicated level by a sound-level meter fluctuates periodically or intermittently and the maximum levels are almost constant, the mean value of the maximum levels is to be obtained.
3. When the indicated level by a sound-level meter fluctuates randomly and widely, the upper value of the 90 percent range is to be obtained.
4. When the indicated level by a sound-level meter fluctuates periodically or intermittently and the maximum level varies, the upper value of the 90 percent range of the maximum levels of each fluctuation is to be obtained.

2.3 - Regulations regarding specified construction work

"Specified construction work" is defined and 85 dB is provided as the value of "regulatory standard" for all areas on the boundary of a construction site. Procedures for the measurement of noise are the same as above.

2.4 - Maximum permissible levels of motor vehicle noise (article 16)

1. *The Director-General of the Environment Agency shall establish the maximum permissible levels of noise produced by the operation of motor vehicles under specific conditions.*
2. *In order to control motor vehicle noise, the Minister of Transport shall make certain that the maximum permissible levels of motor vehicle noise pursuant to the preceding paragraph are not exceeded when establishing particulars to regulate motor vehicle noise by orders pursuant to the Road Transportation Vehicles Law.*

Examples of the latest target values of maximum permissible levels are shown as follow.

Trucks [Motor vehicles with GVW (gross vehicle weight) of over 3.5 t, and maximum engine output of over 150 kW]

- Acceleration running noise 81 dB
- Steady running noise 82 dB
- Proximity stationary noise 99 dB

These values will be enacted in August 2001

2.5 - Requests and opinions based on monitoring (article 17)

1. *Finding through the results of monitoring pursuant to Article 21–2 that motor vehicle noise in excess of the limits established by the ordinance of the Prime Minister's Office causes undue damage to the living environment surrounding roads within designated areas, the prefectural governor may request the prefectural public safety commission to implement measures pursuant to the provisions of the Road Traffic Law (No. 105, 1960).*

2. In addition to requests pursuant to the provisions of the preceding paragraph, the prefectural governor may present his opinion to the person responsible for the management of a given road and/or to the chief officer of the Japanese government agency concerned in regard to the structural improvement of particular sections of said road and other modifications that will contribute to reducing the level of motor vehicle noise based on findings reached through monitoring pursuant to Article 21–2.

According to a revision to the Environmental Quality Standards for Noise in 1998, the following revision to the limits (Requested Limits) has been notified on March 2, 2000, and was enacted on April 1, 2000.

Maximum permissible limits

The following are limits for motor vehicle traffic noise that have been established based on the provision in Article 17–1 of the Noise Regulation Law. Whenever the noise level exceeds these limits and has a possible negative impact on the living environment surrounding the road, prefectural governors shall ask the Prefectural Public Safety Commission to take measures, including controlling traffic based on the Road Traffic Law. Maximum Permissible Limits have been established according to area type and time category.

	Area Type	Maximum Permissible Limits	
		Daytime (6:00–22:00)	Nighttime (22:00–6:00)
1	A and B facing a road with one lane	65 dB	55 dB
2	A facing a road with two or more lanes	70 dB	65 dB
3	B facing a road with two or more lanes and C facing a road with one or more lanes	75 dB	70 dB

Table 6.

Separate limits: for areas adjacent to arterial roads, 75 dB (daytime) and 70 dB (nighttime) shall be applied.

Notes:

- Noise levels shall be measured in L_{Aeq} through each time category.
- Noise levels shall be monitored at the edge of the road.
- The two time categories shall be defined as daytime, from 6:00 to 22:00, and nighttime, from 22:00 to 6:00 the following day.
- Area type **A** shall represent areas that are exclusively for residential use.
- Area type **B** shall represent areas that are mainly for residential use.
- Area type **C** shall represent areas that are for commercial and industrial use and for significant residential use.

3 - ENVIRONMENTAL IMPACT ASSESSMENT LAW

The Environmental Impact Assessment Law was enacted in June 1999 for the purpose of ensuring that corporations properly review, estimate, and assess the environmental impact of their projects in advance, the results of which should give proper consideration to environmental conservation in the implementation of such projects.

4 - CONCLUSION

The evaluation of noise was changed from the conventional L_{50} to L_{Aeq} for the new environmental quality standards for noise set out in the text. In addition, a new evaluation principle was introduced, which includes such evaluation methods as that which uses the level of noise at which individual residences are affected. This has allowed a more accurate noise evaluation and allowed the environmental quality standards to function more effectively as targets in conserving the living environment.

Furthermore, reference values for environmental quality standards were derived from new scientific knowledge in L_{Aeq} concerning the impact of noise, and these values improved the overall evaluation of both general areas and areas facing roads as compared to the conventional environmental reference values.

Separate reference values for areas adjacent to arterial roads were provided, taking into consideration the actual location of a significant number of residences in such areas as well as restrictions in terms of Japan's land and automobile traffic conditions, because it was considered appropriate to encourage specific measures that would meet the special conditions in said area.

Under the Basic Environment Law, environmental quality standards "must always be subject to proper scientific judgment and necessary revisions," and in the future it will be necessary to pursue knowledge that is based especially on the actual impact of noise on sleep and residents' reactions to such noise in Japan. It is considered important to address the promotion of comprehensive measures to regulate noise, including the establishment of an expanded institutional framework that is geared toward satisfying environmental quality standards while cooperating with Japanese government agencies concerned, local public entities, etc.

Main Japanese laws and standards for environmental issues are shown in English on the Environment Agency of Japan's Web page: <http://www.eic.or.jp/eanet/en/index.html>.