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The newly amended Noise Control Standard in Taiwan

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ABSTRACT

In an effort to alleviate noise problem, the Noise Control Standard was established to set criteria for the noise generated by different sources including factories, business places, entertainment establishments, construction sites, and public announcement facilities in accordance to the Category of Noise Control Zone Legislature of 1992. In recent years, there has been an increase in environmental awareness as reflected by the additional requests received from residents demanding a quieter living environment. In retrospect, the number of noise complaints received increases every year (~10 % per year.) For instance, in year 2005 alone, there were more than thirty-eight thousands (38,000) noise related complaints received. In an attempt to relieve the comprehensive noise complaints problem, the Environmental Protection Administration (EPA) in Taiwan along with various local governmental authorities have taken steps to amend the Noise Control Standard in order to tighten the regulation and effectively enforce the new noise detection criteria within various industry generators. The first step was to set the low-frequency noise criteria in 2005 for both business places and entertainment, which are the leaders in noise production that induce primary complaints among all noise generators. Immediately following that was the amendment for Noise Control Standard in 2006 targeted mainly for factories. This amendment was modified and adopted base on the conclusion of several case studies conducted in the previous years. It includes the addition of low-frequency noise criteria for factories as well as amending several noise detection criteria including measurement method for different spots and the criteria for different noise generators. This paper samples some of the numerous noise complaints received in recently years and highlights the revised articles in the newly amended Noise Control Standard.

1 INTRODUCTION

Taiwan is one of the most densely-populated places in East Asia. For example, the population density of Taipei City is about 9,684/km^2 in 2006. Because of the densely population, the noise is one of the most concerned environmental problem to solve. It started with the promulgation of the Noise Control Act in 1983 to control the noise problem. The last amendment for Noise Control Act was announced in 2003. The central competent authority is Environmental Protection Administration (EPA) and in which the Department of Air Quality

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Protection and Noise Control is assigned responsibility for noise control duties. In 1992, the EPA announced the Noise Control Standard, which was stipulated in accordance with the Noise Control Act. In this standard, the noise emitted from the factories, business places, entertainment establishments, construction sites, and public announcement facilities within noise control zones shall not exceed noise control criteria. As a result of improved environmental awareness in recent years, Taiwan's residents have increased their demand for a quieter environment. The Standard is helpful to protect the living environment for the passed years, but several complaints were still not solved even if the official of Environmental Protection Bureaus measured the noise generators. After several studies, measurement results revealed that some noise generators have the characteristic of low frequency noise. The first step was to set the low-frequency noise criteria in 2005 for both business places and entertainment, which are the top in noise production that induce primary complaints among all noise generators. Immediately following that was the amendment for Noise Control Standard in 2006 targeted mainly for factories and will come into effect from Jan, 1, 2008.

2 THE ANALYSIS OF NOISE COMPLAINT CASES

2.1 Number of complaints

The number of noise complaint was figured since 1988, it have shown that the increase trend for a long time except 2001 and 2006. The annual increase rate is about 9.8% as Figure 1 shown.

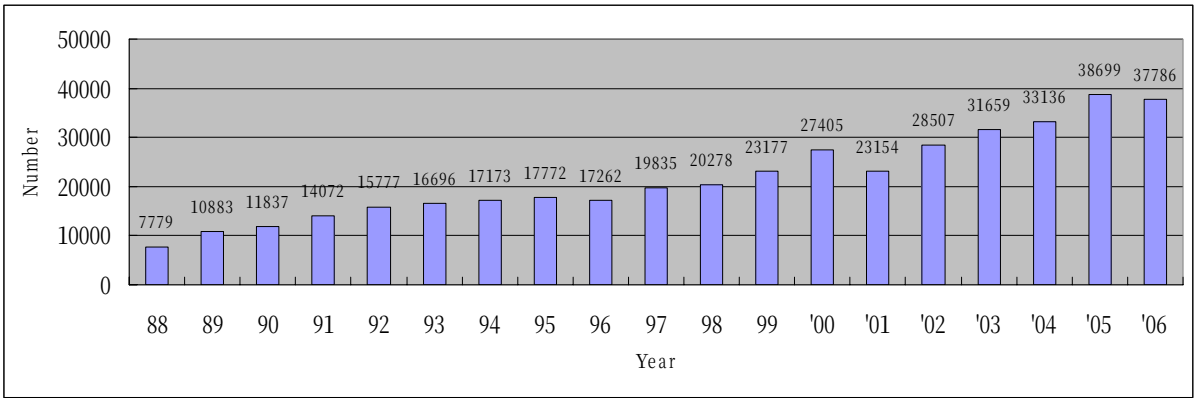

Figure 1: The number of noise complaints from 1988 to 2006

2.2 Petition method comparison

There are several petition ways to complain for noise, in Table 1, it shows that the telephone and oral is the major method to complain to competent authorities.

Table 1: Petition cases comparison by petition methods.

	Document	Telephone or Oral	Newspaper	Internet	Police or other Agencies	Others
2001	1,015	20,478	17	400	487	757
2002	1,137	24,276	24	1,755	931	384
2003	1,138	25,850	18	2,747	1,458	448
2004	819	28,632	29	2,132	1,275	249
2005	899	33,568	47	2,536	1,450	199

2.3 Noise sources

The noise sources are classified as factories, business places, entertainment establishments, construction sites, and public announcement facilities, traffic noise, military noise and others. In Figure 2, the complaint cases for business places and entertainment establishments increased sharply these ten years. Besides that, the cases exceeded the complaints for factories since 2000. It showed that the life pattern changes in recent years.

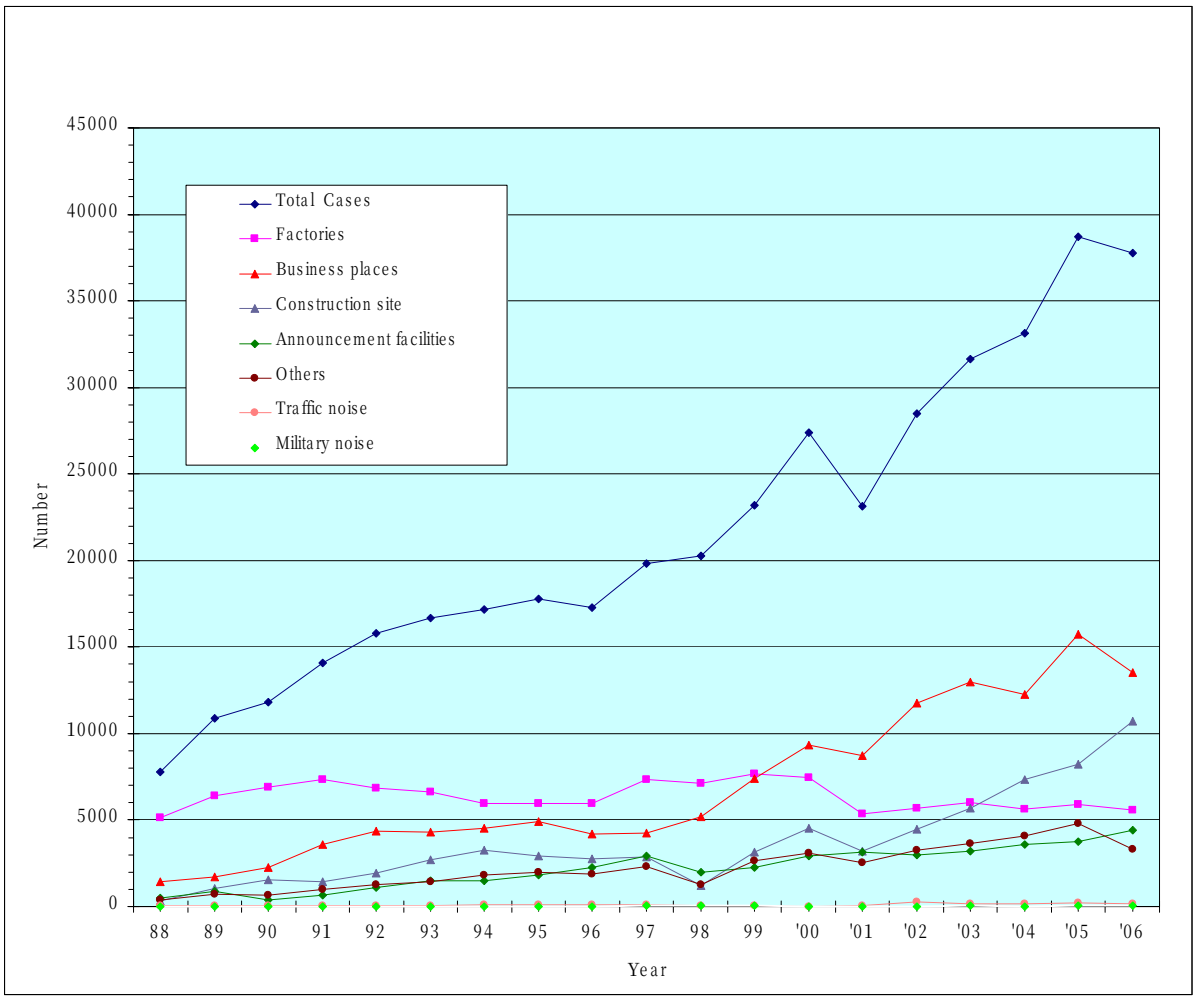

Figure 2: The trend of different noise complaint sources from 1988 to 2006

3 THE RELATED REGULATION

3.1 Noise Control Zone

The purpose for Noise Control Zone making is to protect the living environment for people. The Noise Control Zone is based on “Guideline for Noise Control Zone Making” and the Noise Control Zones are designated to suit the measure to local conditions by local governments. There are four classes and general cases are as following:

Class 1: For the areas which need very quite environment
Class 2: The areas which for residential use mainly
Class 3: Residential and commercial areas mixed or residential and industrial areas mixed
Class 4: Industrial area

The detailed specified noise control zones are announced by local environmental protection bureaus(EPB).

3.2 Noise Control Standard

The noise emitted from factory plants or sites, entertainment premises, business premises, construction projects, public address facilities shall not exceed the Noise Control Standards within each noise control zones.

4 AMENDED CONTENT

From the noise complaint situation and analysis, the EPA should adopt some tactics to lower the complaint cases. The first step is to cut down the complaints for business places and entertainment establishments, so the EPA established the low-frequency noise criteria for the business places and entertainment establishments in 2005. Immediately following that was the amendment for Noise Control Standard in 2006 targeted mainly for factories. This amendment was modified and adopted base on the conclusion of several case studies conducted in the previous years. It includes the addition of low-frequency noise criteria for factories as well as amending several noise detection criteria including measurement method for different spots and the criteria for different noise generators. Following are the important items:

4.1 Time intervals

There are four time intervals been divided in 24 hours before the amendment. According to the change of life pattern and the suggestion of the EPB and, morning interval was cancelled. In Class 1 and Class 2, the daytime is from 06:00 a.m. to 08:00 p.m., evening is from 08:00 p.m. to 10:00 p.m., nighttime is from 10:00 p.m. to 06:00 a.m.. In Class 3 and Class 4, the daytime is from 07:00 a.m. to 08:00 p.m., evening is from 08:00 p.m. to 11:00 p.m., nighttime is from 11:00 p.m. to 07:00 a.m..

4.2 Instrumentation

According to the modification of CNS No. 7129 of standards for sound level meter, the Noise Control Standard amended the relevant content and mentioned the IEC 61260 for low-frequency noise measurement.

4.3 Period of observation

Measurement shall be made at the time when the noise generated is most representative or at the time designated by the applicant concerned.

4.4 Measurement Position

Measurement shall be made at any place outside the surrounding boundaries of a factories, business or entertainment place, an arcade or external walls of a building in addition to the residence. Surrounding boundaries shall mean the periphery of the place having a physical partition such as a retaining wall, or the periphery of the area occupied by the property of the entertainment or business place or of the area surrounding such place which is not often accessible by the public, if there is no physical partition surrounding the factory or business premises.

4.5 Evaluation Method

Because people’s impression of noise not merely only by volume but also by duration. It is important to choose the suitable index. Based on the following sound characteristics to calculate the Leq or Lmax, the results shall not exceed the values shown in the above table.

(1) If the peak of noise read from sound level meter displays regularly at periodic or intermittent cycles with the maximum value approximately the same, take the

average of the Lmax in five consecutive readings.

(2) Other situations shall be expressed by Leq. Because the EPBs opinion showed that measure for 8 minutes is too long, in this amendment, the sampling time changes from 8 minutes to 2 minutes. It means that the sampling time shall be less than 2 consceutive minutes and the sampling time interval shall not exceed 2 seconds.

4.6 Criteria

The noise standards of factory plants or sites, entertainment premises and business premises are as the following tables. The equation for low-frequency noise from 20Hz to 200Hz is as equation 1. The criteria of low-frequency noise for factories are as table 3 and overall noise is as table4.

$$L_{eq,LF} = 10 \times \log \sum_{n=20Hz}^{200Hz} 10^{0.1 \times L_{eq,n}} \quad (1)$$

Table 3: Low-frequency noise criteria for factories

Noise control zone	20 Hz-200 Hz		
	Daytime	Evening	Nighttime
Class 1 and Class 2	42	42	39
Class 3 and Class 4	47	47	44

Table 4: Noise criteria for factories

Interval value / category	Daytime	Evening	Nighttime
Class 1	50	45	40
Class 2	60	55	50
Class 3	70	60	55
Class 4	80	70	65

The criteria of low-frequency noise for business places, entertainment establishments are as table 5 and overall noise is the same as table4.

Table 5: Low-frequency noise criteria for business places, entertainment establishments

Noise control zone	20 Hz-200 Hz		
	Daytime	Evening	Nighttime
Class 1	35	35	30
Class 2	40	35	30
Class 3 and Class 4	40	40	35

5 SUMMARY

Noise problem is one of the most concerned environmental problems in Taiwan. For a better environment, it is important to control the noise from the factories and business places and so on. The EPA expects that the newly amended regulation could solve the problems which were difficult to solve before. It has reflected at the complaints number in the 2006.

6 REFERENCES

[1] Statistical Report for Environmental Protection, 2006.