inter.noise 2009
Innovations in practical noise control
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INCE
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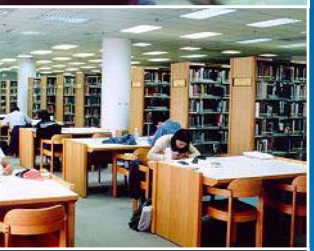


Proposal for Recommended Values of Noise Level for Indoor Public Places in Hospitals and Libraries of the Republic of China (Taiwan)

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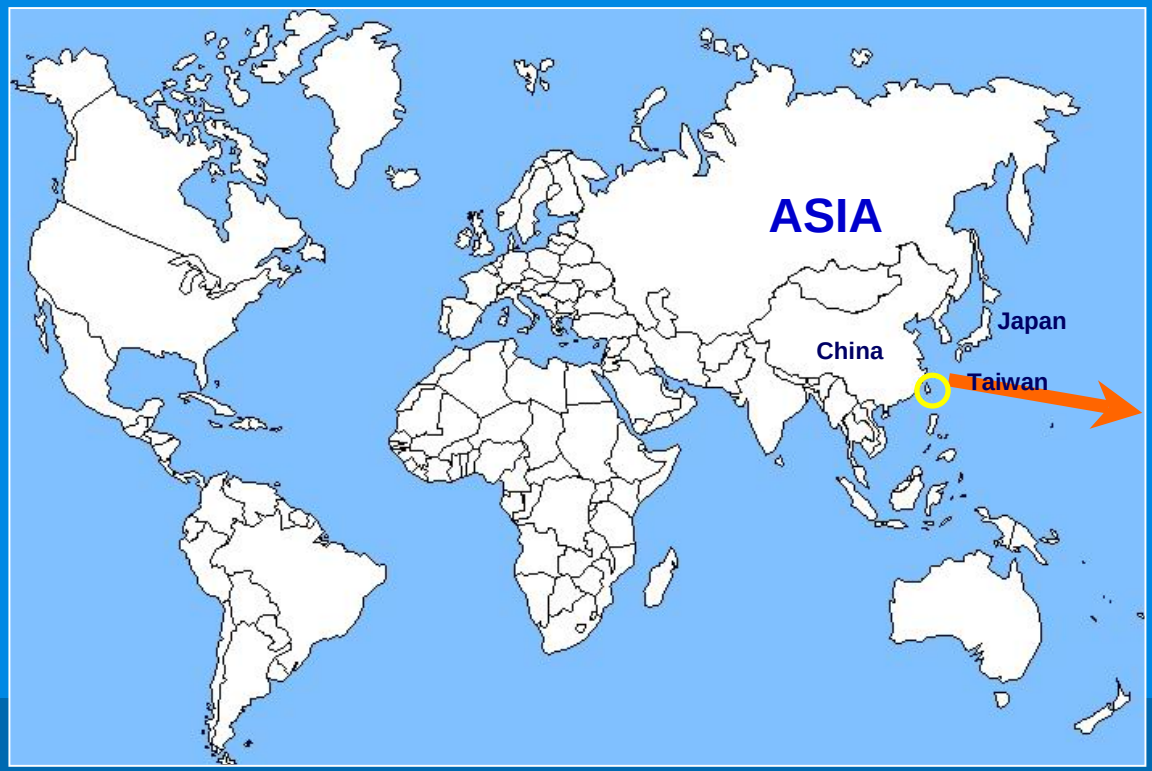
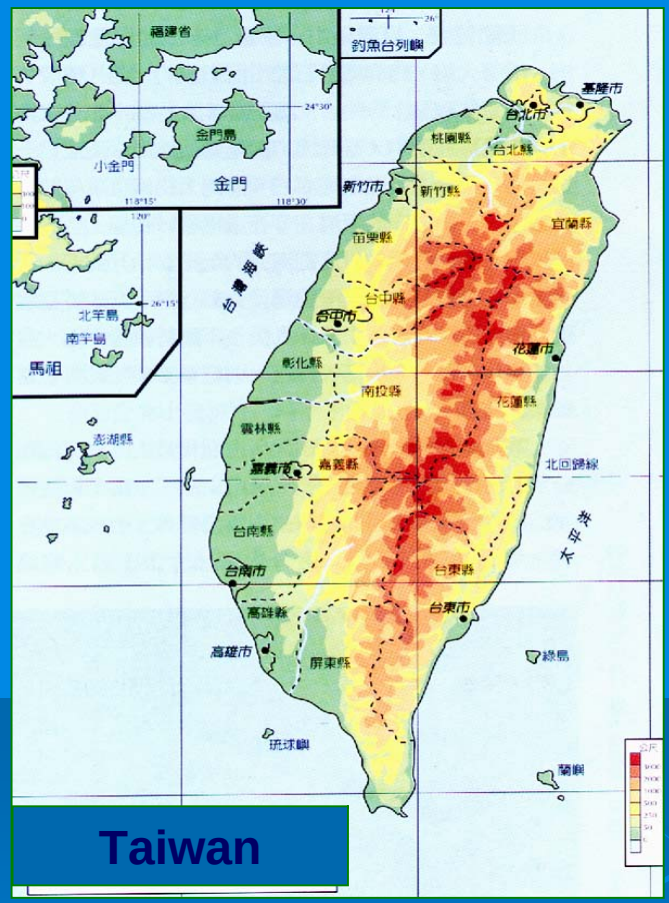
1. Introduction



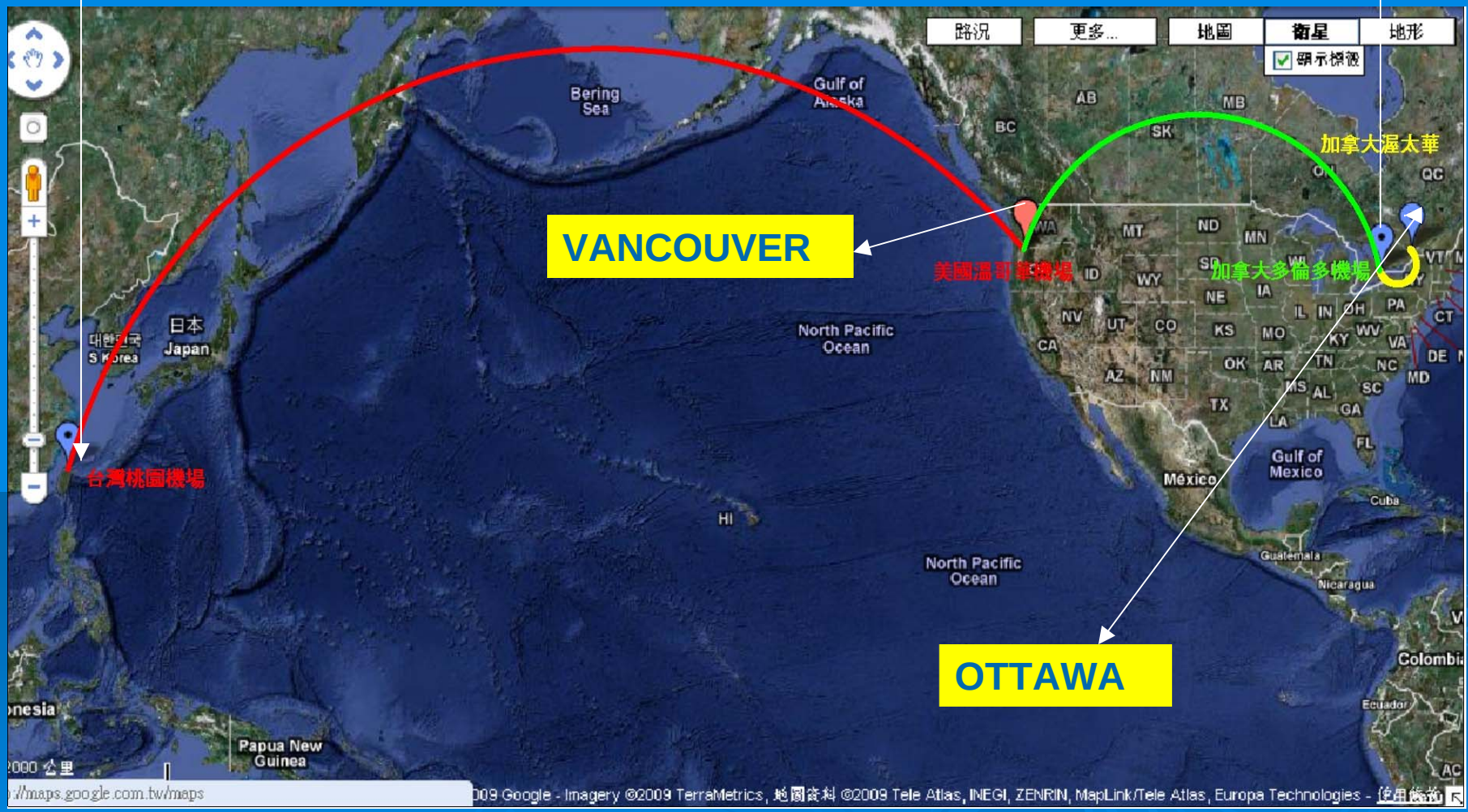


- Area : 36,191 km^2
- Population: 23 millions
- Population density: All over: 637.6/km^2 in 2009.July
  Taipei City: 9,622.1/km^2 in 2009.July

1. Introduction

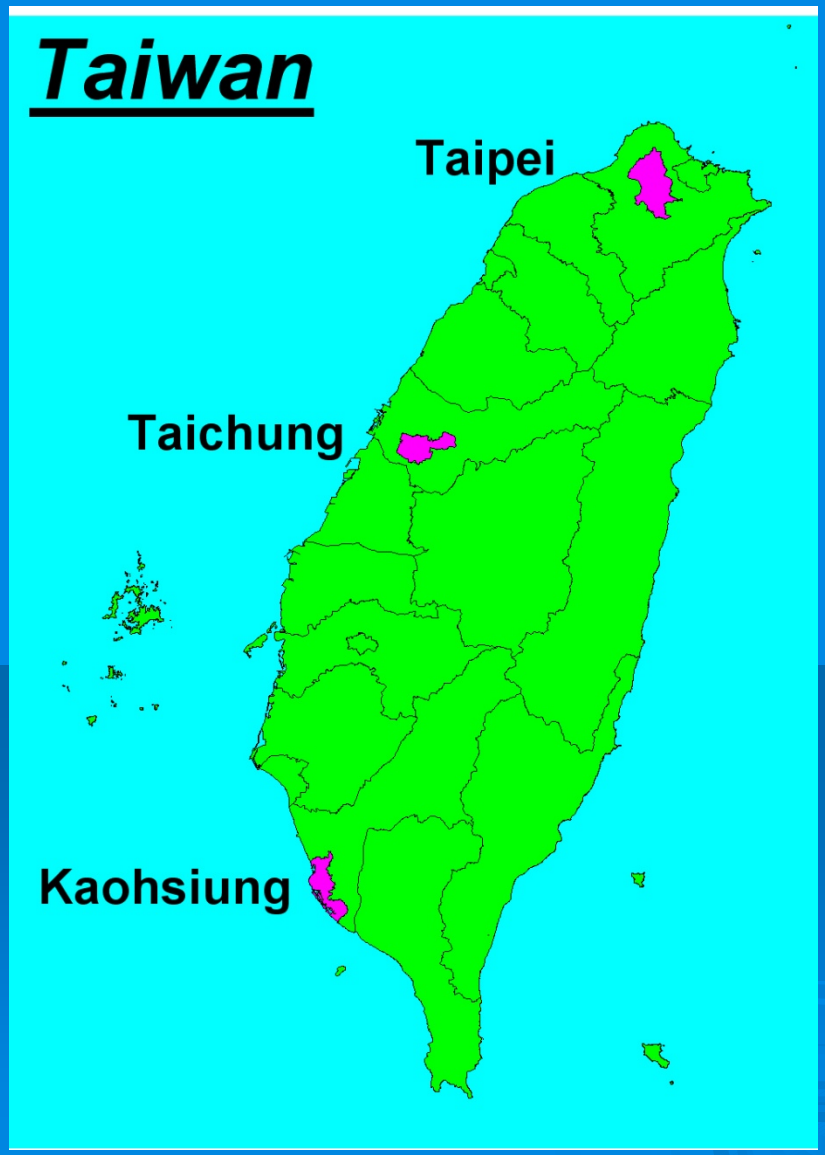
TAIPEI

TORONTO



From: Google Map

1. Introduction



Central authority:

- **Environmental Protection Administration, EPA**

Local government authority: 23 EPBs

24 hours complaint line

1. Introduction

- Well-established National Health Insurance program .
- Lots of hospitals—comparatively inexpensive and convenient to go to the hospital for medical advice in Taiwan. (6-7 CAD per regular medical treatment)
- Talking noise is the main noise sources in hospitals.
- Libraries are more necessary to maintain a quiet environment.
- Old large-size air conditioners, mobile phones and talking noise are the main source of noises in libraries.

2. Noise level determination and recommended values for noise control in indoor public places

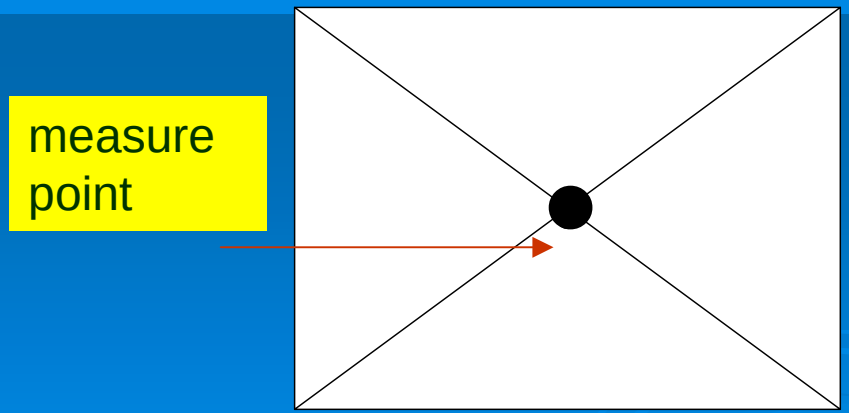
2.1 Measuring method

2.1.1 Sound level meter-
CNS 7129 Type I
IEC 61260 Class 1 standards.

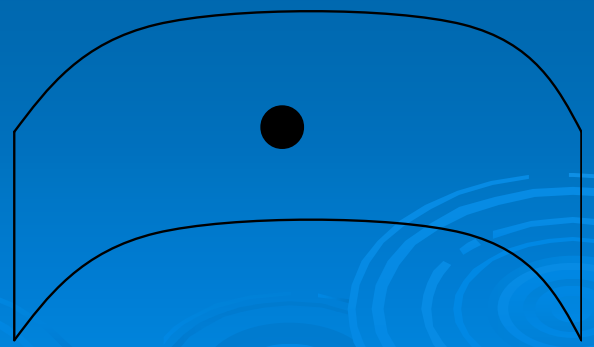
2.1.2 Measuring method
1.Sound level meter
(1) A-weighted
(2) Fast mode
(3) Every hour and last for 24 hours

2.Location of the sound level meter and numbers of measuring points

(1)When taking measurements in a room $\leqq$ 30 m^2 --choose 1 measuring point near the center of the room and keep it at least 1 meter away from any reflection surfaces. The doors and windows of the room should be closed.

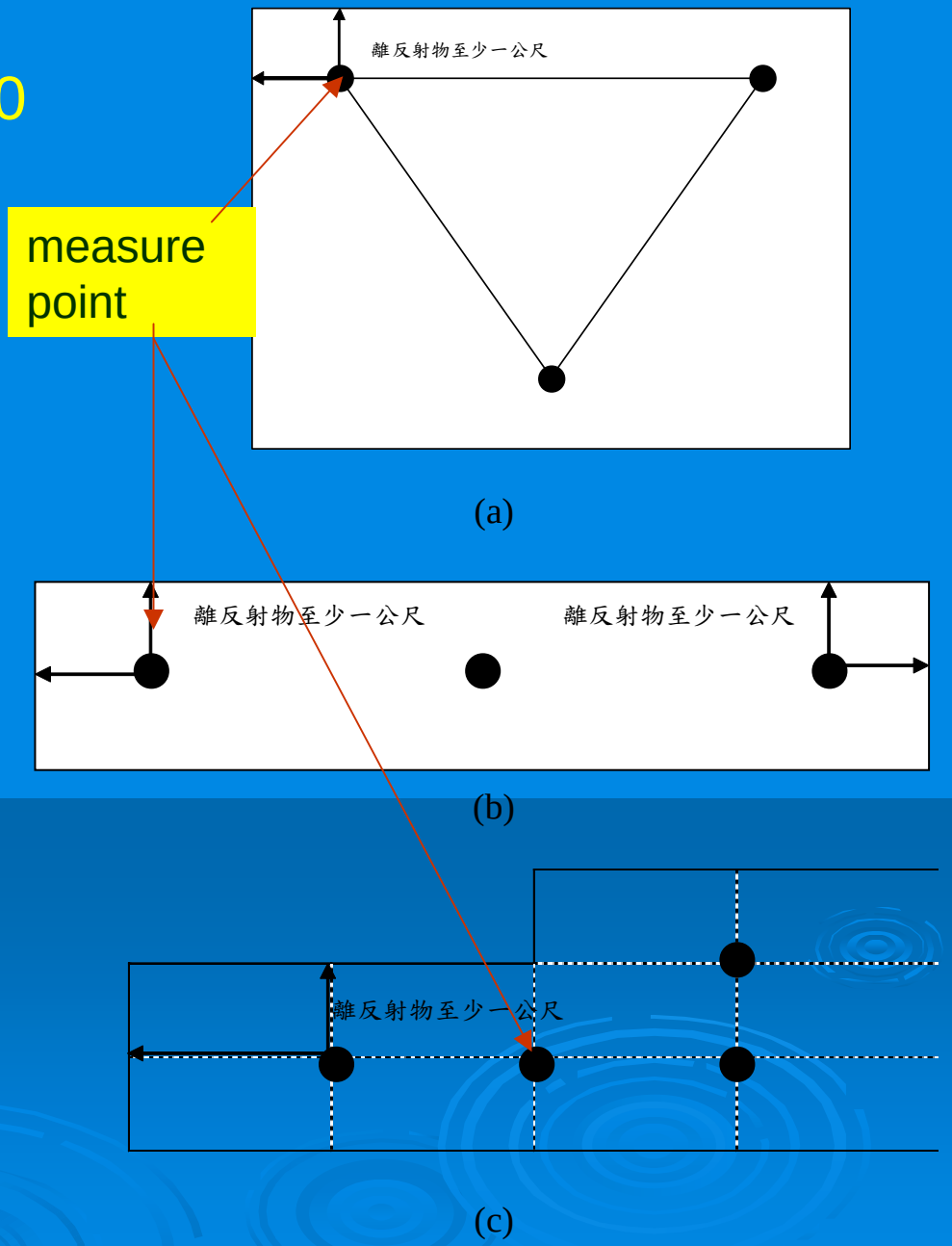


(a)



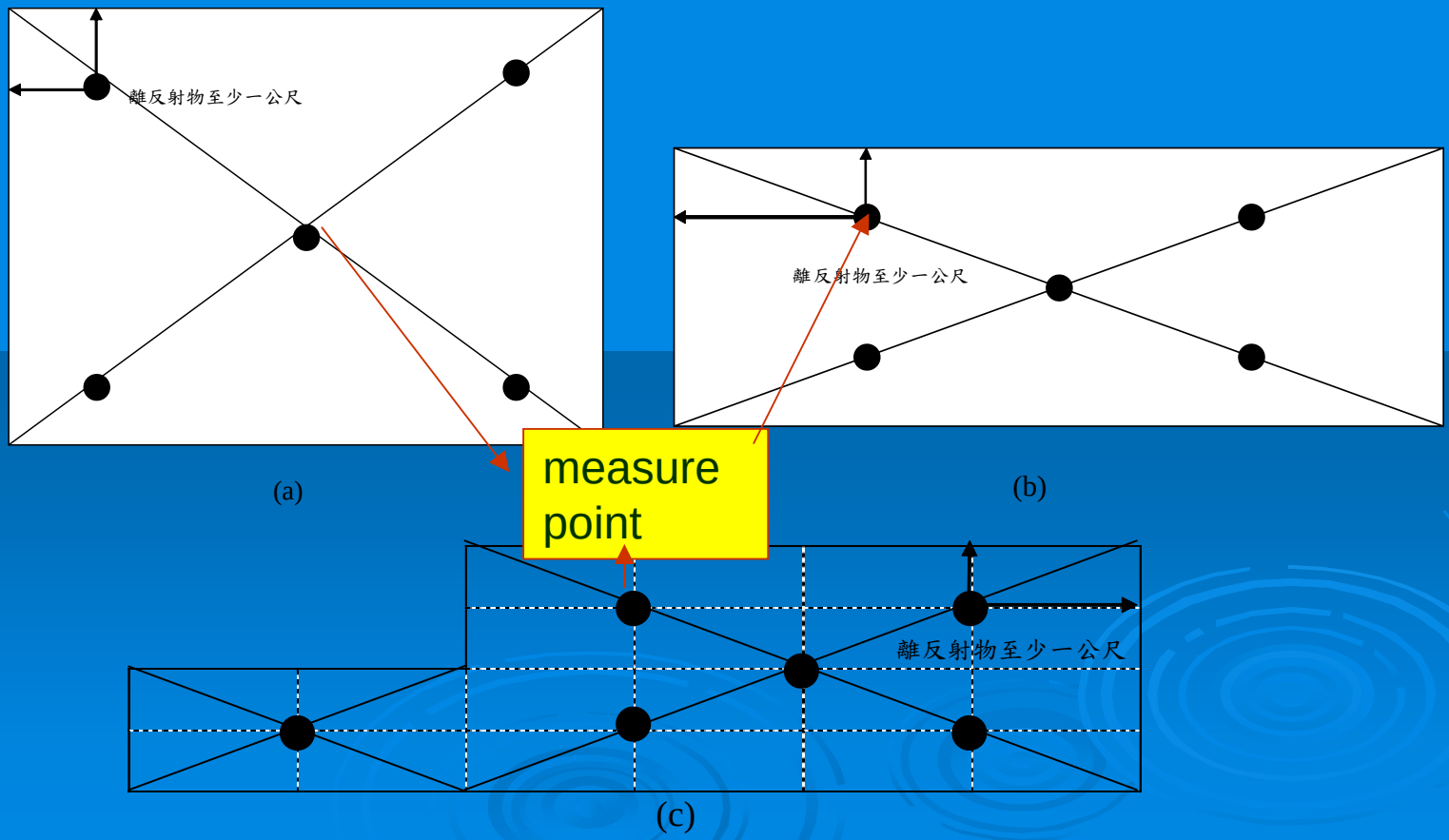
(b)

(2) In a room with an area > 30 m^2 and $\leqq$100 m^2, choose at least 3 measuring points near the center of the room and keep them at least 1 meter away from any refection surfaces. The doors and windows of the room should be closed.



(3) In a room with an area > 100 m^2, choose at least 5 measuring points and keep them at least 1 meter away from any reflection surfaces.

The doors and windows of the room should be closed.



2. Noise level determination and recommended values for noise control in indoor public places

2.2 Questionnaire findings

1.1408 respondents for hospitals

(1) Status and analysis of indoor noise level of hospitals

28.5% -- the indoor noise problem of hospitals was not serious,
56.3% -- thought the problem was ordinary,
only 15.3% thought the problem was serious.

2. Noise level determination and recommended values for noise control in indoor public places

2.2 Questionnaire findings

1.1408 respondents for hospitals

(1) Status and analysis of indoor noise level of hospitals

A.Talking noise---the main noise source

44.8% among total noise, derives from the waiting area and the lobby of the hospital.

B.Clamoring noise-the second noise source

30.8% among the total noise.

70.7% of the respondents thought that the sound-absorbing effect in hospitals was ordinary

11.6% thought the sound-absorbing effect was good

17.7% thought the sound-absorbing effect was poor.

2. Noise level determination and recommended values for noise control in indoor public places

2.2 Questionnaire findings

1.1408 respondents for hospitals

(1) Status and analysis of indoor noise level of hospitals

C.Indoor echoing---

71.9% thought that there was an echoing problem in hospitals among which 36.4% thought the problem was not serious, 56.5% thought the problem was ordinary, only 7.1% thought the problem was serious.

D.The noise expectation of the public for hospitals—

34.7% of the respondents expect the indoor area of hospitals to be in a state of quietness.

2. Noise level determination and recommended values for noise control in indoor public places

2.2 Questionnaire findings

1.1408 respondents for hospitals

(2) Impact and analysis of indoor noise level in hospitals

The impact of the indoor noises-

41.6% --they were not bothered by the indoor noises

51.3% -the bothering of indoor noises was bearable

8.1% - the bothering of indoor noises was unbearable.

2. Noise level determination and recommended values for noise control in indoor public places

2.2 Questionnaire findings

1.1408 respondents for hospitals

(2) Impact and analysis of indoor noise level in hospitals

The interference level of the indoor noises—

41.9% -- slightly bothered by the indoor noises

in their thinking and reading

2.3% --felt annoyed with the indoor noises.

2. Noise level determination and recommended values for noise control in indoor public places

2.2 Questionnaire findings

2.494 respondents for libraries

(1) Status and analysis of indoor noise level of libraries

A.54.2% -- the indoor noise problem of libraries was not serious

B.41.7% --the problem was ordinary

C.Only 4.1%--the problem was serious.

D.28.4% thought that talking noise was the main indoor noise source in libraries, followed by vibrating/ringing of mobile phones (23.6%), and then moving of tables and chairs (14.5%).

2. Noise level determination and recommended values for noise control in indoor public places

2.2 Questionnaire findings

2.494 respondents for libraries

(1) Status and analysis of indoor noise level of libraries

A.The indoor echoing--67.7% thought that there was an echoing problem in libraries, among which 51.6% thought that the problem was not serious.

B.The noise expectation of the public for libraries, 74% expect the indoor area of libraries to be in a state of quietness.

2. Noise level determination and recommended values for noise control in indoor public places

2.2 Questionnaire findings

2.494 respondents for libraries

(2) Impact and analysis of indoor noise level in libraries

Regard to the interference level of the indoor noises,

69.8% --not bothered by the indoor noises in their thinking and reading .

27.1%--felt a little annoyed with the indoor noises.

2. Noise level determination and recommended values for noise control in indoor public places

2.3 Results of sound level measurement and recommended values

2.3.1 Hospitals

As shown in figures 2.3-1 and 2.3-2, 46% comply with $L_{Aeq(hr)}$ = 60dB(A) and 42% comply with L_d = 60dB(A).

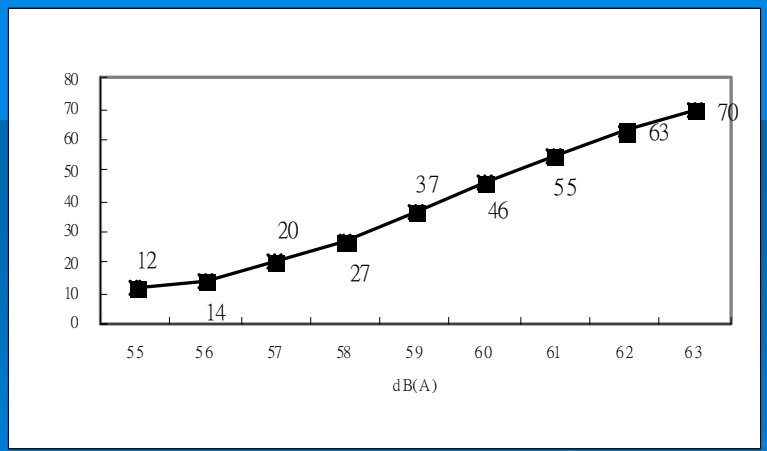


Fig. 2.3-1 Line chart of conformance rate of $L_{Aeq(hr)}$ for hospitals

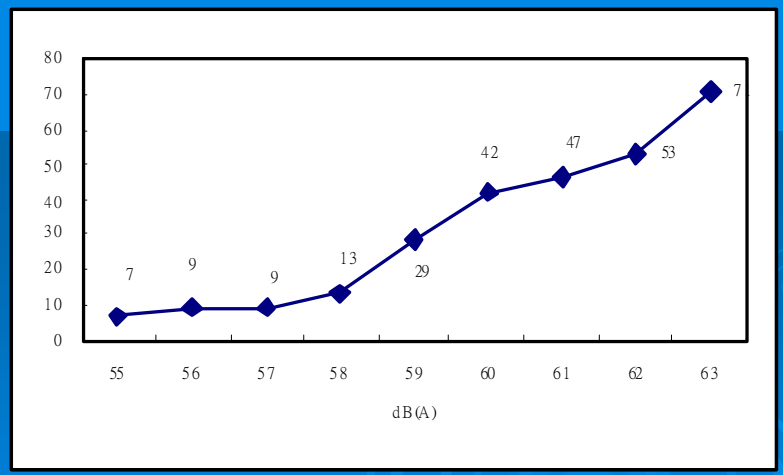


Fig. 2.3-2 Line chart of conformance rate of L_d for hospitals

2. Noise level determination and recommended values for noise control in indoor public places

2.3 Results of sound level measurement and recommended values

2.3.2 Libraries

As shown in figures 2.3-3 and 2.3-4, 54% comply with $L_{Aeq(hr)}$ = 50dB(A), 77% comply with $L_{Aeq(hr)}$ = 53dB(A), 52% comply with *Ld* = 50dB(A), and 72% comply with *Ld* = 53dB(A)

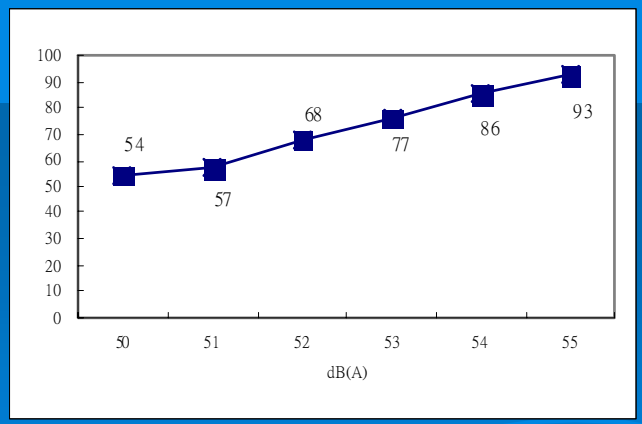


Fig. 2.3-3 Line chart of conformance rate of $L_{Aeq(hr)}$ for libraries

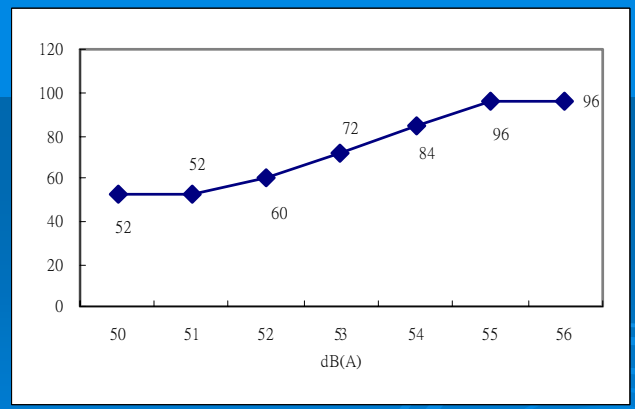


Fig. 2.3-4 Line chart of conformance rate of L_d for libraries

3. Quietness Mark

Due to the effort of our EPA members, such as Director general Ching-shi Yang, Section chief Li-chung Chou and Senior Environmental Specialist I-Chun Lin, we have announced the Quietness Mark of our country on 24th March,2009.

3. Quietness Mark

It was selected among 245 competitions in public.

"Quietness Mark" is composed of a house, a hushing sign and a smiling face, to remind the public to keep quiet in public places which need to be tranquil.

At the same time, we have made an education film with EPA Administror Stephen Shen to educate the public to speak softly in public places. The following is our ***Quietness Mark*** and the film.

3. Quietness Mark


台北關稅局稽查組
Inspection Division Taipei Customs Office
04/03/2009


兒童閱覽室
Children's Reading Room


Children's Reading Room
04/02/2009


戒菸專線：0800-63-6
菸害申訴專線：0800-5
寧靜場所
04/03/2009


本場所全面禁菸
No Smoking
04/03/2009


入境大廳
Arrival Lobby
出境大廳
Departure Lobby
04/03/2009


警衛室
Guard Room
Notice
信勢國小附設幼稚園
2009/5/5 14:23

4. Conclusions and recommendations

4.1 Conclusions

4.1.1 Conduct indoor noise measurements in public service areas and statistical analysis of the results

1. In the public service areas of hospitals, 46% comply with $L_{Aeq(hr)}$ = 60dB(A) and 42% comply with *Ld* = 60dB(A).
2. In the public service areas of libraries, 54% comply with $L_{Aeq(hr)}$ = 50dB(A) and 52% comply with *Ld* = 50dB(A).
3. Normally, the more the people in the space, the higher the *Ld*.

4. Conclusions and recommendations

4.1 Conclusions

4.1.1 Recommended values

1.The recommended value for indoor noise control in public service areas of hospitals is proposed as $L_{Aeq(hr)}$ = 60dB(A).

2.The recommended value for indoor noise control in public service areas of libraries is proposed as $L_{Aeq(hr)}$ = 50dB(A).

4. Conclusions and recommendations

4.1 Conclusions

4.1.2 Distribution of noise sources in public service areas of hospitals and libraries

1.Public service areas of hospitals：

(1) Space-related: Registration & Cashier, waiting areas and ER(ambulances).

(2) Equipment-related: air conditioners, printers,medical record trolleys.

(3) People-related: talking, mobile phones, kids crying, nurses running,nursing stations.

(4) Others: concerts (performances), paging and television, number calling.

4. Conclusions and recommendations

4.1 Conclusions

4.1.3 Distribution of noise sources in public service areas of hospitals and libraries

2.Public service areas of libraries

(1) Space-related: drinking water facilities, service counters and discussion room.

(2) Equipment-related: drinking water machines, air conditioner, printers, copy machines,

(3) People-related: mobile phones, chatting/talking.

4. Conclusions and recommendations

4.2 Recommendations

4.2.1 Install noise monitoring alerting systems in the public service areas of hospitals and libraries.

When the noise exceeds indicator values, the system will automatically reveal or report the situation to the hospital or library and people on the screen to softly advise them to quiet down.

4.2.2 Propose a recommended value for indoor noise at public service areas of hospitals as *LAeq(hr)* = 60 dB(A)and of libraries as L *Aeq(hr)* = 50dB(A).

4. Conclusions and recommendations

4.2 Recommendations

4.2.3 It is useful to keep the enviornment quiet by improving the public education,

stick posters（like Quietness Mark）,

we have delivered 100,000 of the mark to the public place authority agency and the volunteers at the public service areas of hospitals or libraries.

"We all breathe the same air,

We all inhabit in the small planet…..,we all cherish our children's future!"

Thank you so much for your attention ! !

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