Noise limits, controls and legislation in the Asia-Pacific region

NOISE LIMITS, CONTROLS AND LEGISLATION IN THE ASIA-PACIFIC REGION

A. L. BROWN
School of Australian Environmental Studies
Griffith University, Nathan 4111
Brisbane, Australia

and

N. J. EDDINGTON
Division of Environment,
Dept. of Environment and Heritage
Brisbane, Australia

INTRODUCTION

Noise concerns are no longer restricted to developed nations. The motor vehicle, international and domestic air travel, electro-mechanical equipment and industrial production have brought their benefits, and their associated pollution and health problems, to the rapidly expanding non-agricultural workforces and urbanizing populations of the newly industrializing countries. Even casual observation in any of the cities in the Asia-Pacific Region reveals extensive and intense noise problems from a wide range of sources.

Exposure to damaging levels of occupational noise occurs amongst workers in manufacturing industries, in mining and primary produce processing, in agriculture where mechanization has taken place and in transportation and service industries. Exposure to stressful, though not directly physiologically damaging environmental noise is primarily a city problem. The dominant source of urban noise is road traffic and given the continuing dramatic increase of vehicle numbers in many of the cities of the Region, this problem is truly explosive. Urban noise also includes aircraft noise sources, particularly where older airports are located within the cities or where cities have expanded to surround new airport facilities, and both industrial and domestic sources resulting from the high residential densities and the sometimes minimal separation of residential from incompatible land uses.

Published information on the noise problem in the Region is predominantly from Japan, Australia and New Zealand, Singapore and Hong Kong (eg Heng, 1978; Heng et al, 1984; Brown et al, 1985; Brown and Lam, 1987) though McNulty (1987) provides some evidence on the extent of transportation noise problems in Korea and Malaysia.

However, nearly all Governments in the Asian-Pacific Region have attempted, to varying degrees, to respond to these problems and the purpose of this paper is to report on the regional status of the adoption of occupa-

tional noise limits, the development of noise control legislation and policies, and the implementation of land use control strategies to tackle the noise problem. The intent is to provide a broad overview of these matters in the Region and to highlight needs and deficiencies which can facilitate the exchange of experience and technical know-how from those countries with extensive experience in noise control to those without. No attempt has been made to independently assess the effectiveness of the implementation of any of the legislation or strategies listed, nor, except for indicating the availability of noise measurement equipment, the technical capabilities to enforce them. For more detailed information on policies, regulations and procedures adopted within specific countries, the reader should consult WHO (1988).

OCCUPATIONAL NOISE LIMITS

Table 1 summarizes hearing conservation controls in the Region. High levels of noise in occupational settings over a working life-time can result in permanent hearing damage and eventual disability in human communication. To prevent such damage, maximum levels are set for day-to-day exposure. Table 1 shows the eight-hour working day noise limits in those countries where occupational standards have been set and whether these are regulated limits or recommendations. For periods of exposure shorter than eight hours there is a trade-off between level of exposure and duration of exposure and the trade-off adopted in the various countries is also shown in Table 1. For example, in Hong Kong, permissible exposure is 90 dB(A) for eight hours of exposure while for four hours it is 93 dB(A). However in the Philippines, permissible exposure is 90 dB(A) for eight hours of exposure but for four hours it is 95 dB(A). The difference between the 3 dB(A) and 5 dB(A) trade-off reflects the "Atlantic Divide" – that is whether a country's standards have been imported from Europe or the USA respectively. The level of the base limit, at 90 dB(A) or 85 dB(A), is generally an economic decision. Because of wide variation in the susceptibility of people to hearing damage, neither level is a limit below which all exposed persons will be "safe", though the lower level protects a greater proportion of workers than the higher.

Table 1 - Summary of Permissable Limits and Exposure/Duration Trade-off for Hearing Conservation in Countries in the Asia-Pacific Region

Country	Permissable limits of continuous noise 8-hr (dB(A))	Trade-off per halving exposure time	Status
Australia	90 (85 in two Territories)	3	Enforceable
China	90	-	Enforceable
Fiji	-	-	-
Guam	-	-	-
Hong Kong	90	3	Enforceable
Japan	85	3	Recommended
Malaysia	In preparation	-	-
New Zealand	85	3	Enforceable
Papua New Guinea	-	-	-
Philippines	90	5	Enforceable
Republic of Korea	90	5	Enforceable
Singapore	85	-	Enforceable
Viet Nam	90	5	Recommended

ENVIRONMENTAL NOISE CONTROLS

Table 2 shows the status of environmental noise controls for fixed noise sources (industrial plants, air-conditioning plants, exhaust vents etc) for noise from construction sites, for motor vehicle noise emissions, and for controls over neighbourhood noise (primarily any type of noise from domestic premises).

Emission controls on motor vehicles shown in the Table are of two types. New vehicles are certified as meeting prescribed noise limits before they can be released by a local manufacturer or imported. Once in service, vehicle tests are required to ensure that their low noise emissions are maintained. It should be noted that the absence of new vehicle noise controls in several countries opens up the opportunity for "dumping" of vehicles which do not conform to noise emission standards elsewhere.

Table 2 - Summary of Environmental Noise Controls in Countries in the Asia-Pacific Region

Country	Legislation for fixed noise sources	Controls over neighbourhood noise?	Emission controls on individual motor vehicles	Construction noise controls
Australia	Yes, well developed	Police/Local Authority	New/in service (not all States)	Yes
China	Yes	-	-	Yes
Fiji	Scattered controls under different Acts (limited enforcement)		-	-
Guam	-	-	-	-
Hong Kong	Yes	Police	Requirement for efficient muffler	Yes, additional proposed
Japan	Yes (well developed)	Local Authority/ Police	New/in service	Yes, Local Authority
Malaysia	Scattered controls under different Acts (limited enforcement)		New and in-service (not yet enforced)	Yes, Local Authority
New Zealand	Yes (well developed)	Police/Local Authority	New and in-service	Yes, Local Authority
Papua New Guinea	-	-	-	-
Philippines	Yes (limited enforcement)	-	Yes (not yet enforced)	Yes (not yet enforced)
Republic of Korea	Yes (well developed)	-	New and in-service	-
Singapore	Yes, guidelines only on levels	Police/Licensing Unit	New and in-service	Yes, various departments
Viet Nam	-	-		

Noise controls for fixed noise sources, for vehicles and other products, for domestic sources and construction sources, are usually based on legislation and, to achieve effective controls, considerable resources have to be expended on the development of regulations, acquisition of measurement equipment and the training of appropriate enforcement staff. Compounding this is the localized nature of noise problems and the need for staff and equipment at the local, not just the central, level of government. It is not surprising that many countries in the Region do not have such controls or, if they do, that they lack effective enforcement. Many countries report that they do not have adequate noise measurement equipment (Table 3). As one would expect it is the wealthier countries which have well developed environmental controls.

IMPACT ASSESSMENT AND PLANNING CONTROLS FOR NOISE

Table 3 shows the extent of the adoption of planning procedures to minimize noise problems from future developments. Planning measures include the prediction of noise impacts from proposed noise sources such as industry and highways, most usually as part of an environmental impact assessment, the forecasting of noise exposure contours around airports and concomitant controls over noise-sensitive land use developments within the areas exposed to aircraft noise. There are many countries in the Region where control of noise at the planning stage of projects is not performed. This is critical because planning for the prevention of noise problems is the most effective, efficient and appropriate strategy in developing countries. For example, in the development of an airport at a new site there is always potential for land use controls to prevent, or at least retard, the strong pressures for

Table 3 - Summary of Impact Assessment and Planning Controls for Environmental Noise in Countries in the Asia-Pacific Region

Country	Are noise contours available for airports	Controls within airport noise contours?	Routine noise prediction from proposed industries and transport facilities	Adequate measurement equipment
Australia	Yes (ANEF)	Sometimes	Yes	Yes
China	-	-	Yes	No
Fiji	Some	-	-	No
Guam	-	-	-	No
Hong Kong	Yes (NEF)	Yes	Yes	Yes
Japan	Yes (WECPNL)	Yes (land use, building controls, compensation	Yes	Yes
Malaysia	Some (WECPNL)	Yes	-	No
New Zealand	Yes	Yes	Yes (industry) Not always (transport)	Yes
Papua New Guinea	-	-	-	No
Philippines	-	-	-	No
Republic of Korea	-	-	Yes	Yes
Singapore	Yes	-	No	Yes
Viet Nam	-	-	-	No

ANEF Australian Noise Exposure Forecast
NEF Noise Exposure Forecast
WECPNL Weighted Equivalent Continuous Perceived Noise Level

the migration of noise sensitive land uses such as dwellings, schools and hospitals into the areas which will be exposed to aircraft noise. Failure to do so results in the creation of a major noise problem in the future with thousands of people, perhaps millions, subject to excessive noise exposure. In pollution problems generally, and environmental noise problems in particular, it is well recognized that the solution of existing problems is difficult and expensive, if not near impossible in many situations, but the prevention of similar sorts of problems from recurring in new developments is relatively easy.

Even if scarce human and technical resources are not available for regulatory controls on noise, it is short-sighted not to tackle future noise problems which could be reduced by effective impact assessment and planning. The skills required for such assessments can be reasonably easily acquired, the human resources are a small fraction of those needed for enforcement of noise regulations, and very often many of these can be handled at the central level of government.

CONCLUSIONS

Countries in the Asian-Pacific Region represent a wide range of cultures and stages of economic development, but the presence of noise limits and legislation to control environmental and occupational noise in the majority of them is evidence of a widespread recognition of the problems of noise and a desire to tackle them. However, the effectiveness and enforcement of such controls across the countries would appear to be a function of their economic development. Action to control environmental noise is not restricted to legislation – impact assessment of new projects and effective planning to prevent noise problems are important strategies. The planning approaches, aimed at prevention rather than cure, are low cost approaches and can be adopted even in those countries where resources are not available for control of existing problems.

REFERENCES

Brown, A.L., Chan, R., and Chan, H.F. (1985) Surveying the noise exposure of classrooms. *Applied Acoustics 18,* 55-67.

Brown, A.L. and Lam, K.C. (1987) Levels of ambient noise in Hong Kong. *Applied Acoustics 25,* 85-100.

Heng, R.B.W. (1978) The noise problem in high density living in Singapore. *Proc of the Institute of Acoustics (U.K.).* 15.J3.1-4.

Heng, R.B.W. and Hong, Y.K. (1984) Noise induced hearing loss in Singapore. *Asian Environment 6(1),* 22-26.

McNulty, G.J. (1987) Impact of transportation noise in some new industrial countries. *Applied Acoustics 21,* 81-87.

WHO (1988) Noise Control Legislation and Policy in the Western Pacific Region. Regional Centre for the Promotion of Environmental Planning and Applied Studies, Kuala Lumpur.