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Development of Community Noise Action Plans

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Abstract [765] The past decade has seen a considerable increase in efforts around the world to develop effective noise control policies, particularly at the national and international levels. The recent work of the European Commission in developing their Environmental Noise Directive has been particularly visible and represents a major step forward for comprehensive, immission-oriented noise policies. However, most of the current noise policy efforts do not yet adequately address the strategies and tools required at the local community level for managing their noise environment through the use of "local action plans". This paper provides a brief introduction to some of the concepts and techniques that can be utilized to fill this need. It will introduce the idea of Community-Based Environmental Noise Management, which includes a "tool-kit" concept which can be used by local communities. Major components of this approach include use of a modern Environmental Impact Assessment Process (EIAP), land use planning, local noise ordinances and building codes, plus related technical tools and support requirements.

1 INTRODUCTION

Many noise control initiatives in the past have been very successful in engineering terms, but community noise problems still exists, more needs to be done, and without concerted and sustained action these problems will continue to get worse. However, deciding on the most effective noise control option is not just a matter of defining legally required noise exposure criteria and/or mandating the development of action plans to achieve these required noise levels. There are often multiple, conflicting perspectives among the various stakeholders involved in the resolution of community noise issues that must be resolved to achieve effective solutions.

The focus of Community-Based Environmental Noise Management is on a particular geographic area, instead of focusing an individual problem. Thus, it is a place-oriented approach. It involves the full range of involved stakeholders working together in a collaborative effort to manage the local noise environment. It allows the integration of a combination of environmental, economic, and social objectives with the public's interests, with adequate consideration being given to available technical capabilities and resources. It also facilitates the integration of public rights, values and priorities, business/development interests, and government responsibilities. However, It is difficult for government officials to balance the negative consequences of environmental noise against the potential economic, social and other environmental consequences of reducing it. If shutting down a noisy industrial process to reduce noise would mean throwing people out of work, which would be worse for the community, the noise or the unemployment? The community should have the right to participate in the decision-making process in this type of situation. However, different variables can be more or less important in different situations and at different times. The political climate, based on local values and priorities, will often depend on the historical context and

can change over time. Investment in noise control will normally have to be justified against competing demands on available resources. A comprehensive, scientifically defensible environmental noise impact assessment method can provide the framework for estimating the impacts of contemplated development projects, determining allowable community noise exposure levels, and evaluating various noise mitigation options.

Available methods of noise impact assessment do not always agree, however, and can be interpreted differently. This causes confusion about their applicability. Taking note of this, the I-INCE Technical Study Group on Community Noise (TSG #6) is working to provide practical advice for noise management decisions based on noise impact assessments, especially in situations where economic, social and other environmental factors can be as or more important than the noise exposure benchmarks. There is no intention to question existing national or international regulations or guidelines, but rather to assist in the implementation of those policies. The currently evolving I-INCE TSG #6 guidelines, "Community Noise: Environmental Noise Impact Assessment and Mitigation", are not intended to be prescriptive. Instead, they are intended to encourage a rational and comprehensive approach to making environmental noise decisions using the concept of "informed flexibility". The remainder of this paper briefly describes the full ranges of tools and support requirements needed by communities to more effectively manage noise in their environment.

2 REQUIRED TOOLS

2.1 Noise Mapping

The initial starting point for developing a community-based noise management program is to assess the quality and composition of the overall community noise environment. The starting point for this type of assessment is noise mapping. Among others, one tool currently being developed for this purpose is the Urbis software, an instrument for local environmental surveys (http://www.health.tno.nl/urbis). As described by Miedema at al. [1] and Borst [2], Urbis is a methodology for calculating spatial distributions of air pollution and noise and the associated health risks for (parts of) municipalities. The Urbis methodology provides a description of both the current and possible future European States by means of maps and indicators of the environmental quality and associated risks. It also produces an overall picture of various noise sources and their relative contributions to the total community noise environment. Other comparable approaches are being explored, including that described by Dekoninck and Botteldooren [3], using a multi-modal traffic model (MMM), and others. No recommendation is made for which mapping tool is best; these are only examples of what is becoming available today.

2.2 The Environmental Impact Analysis Process (EIAP)

It is quite possible for an expanded environmental noise impact assessment and mitigation process to be developed and implemented in the relatively near-term future, although there almost certainly would be significant political challenges to be met in order to establish the legal basis for its use. Coordinating and clarifying the relationship between regulations and guidelines at the various involved political levels continues to be the major challenge which needs to be addressed. The EIAP guidelines developed in the U.S. and several European countries more than 25 years ago provided an early methodology for conducting an environmental impact analysis, although the original EIAP concept needs to be expanded to include an emphasis on negotiation between the affected parties and the scientific data on the effects of noise on people needs to be updated.

Environmental noise problems obviously involve both source and receiver parties. The attitude of each is determined, at least to some extent, by their understanding of the other party's point of view.

Practical experience shows that explaining the issues from both sides of the problem can often be at least as helpful as engineering noise control defined against arbitrary criteria. To achieve the best compromise solutions it is best to set out all relevant details of any particular case in a framework to maximize transparency and communication among the affected parties. This may require more variables than can easily be displayed on any simple noise exposure map. It is equally important to analyze and portray the predicted impacts of the expected increase in noise exposure on the affected community.

Since the ultimate purpose of any environmental noise management policy is to minimize the negative effects of noise on exposed populations, it is important to have adequate dose-response relationships to describe the potential effects of noise on people as the scientific foundation for noise exposure policies. The selection of noise exposure criteria are political decisions which involves choosing a point along the dose-response curve(s) where the negative effects of noise are balanced against the cost and technical feasibility of implementing adequate noise control options. Thus, government officials need to be provided with accurate dose-response relationships in order to understand how community effects will differ as a function of different exposure levels. The scientific community can provide these dose-response relationships and recommendations for exposure levels that would adequately protect the public health. The scientific community, however, generally does not address the many political and financial trade-offs that must be made in making real-world policy decisions.

For all of the above reasons, an up-to-date Environmental Impact Assessment Process is required to arrive at the best possible decisions at the individual project level, considering the values, priorities and available resources of all affected parties. It provides the link between "ideal" exposure criteria, dose-response relationships which can be used in trade-off analyses, and the noise control options that are considered for each individual development project. Six steps are recommended in performing an environmental impact analysis, including the following:

- Stage A: Define the noise problem (predicted noise exposure and its expected impacts on the community)
- Stage B: Identify potential solutions
- Stage C: Obtain and process all required information
- Stage D: Balance costs and benefits
- Stage E: Recommend optimum solutions and negotiate final Record of Decision
- Stage F: Monitor implementation of agreed-upon solution

The proposed noise management process brings all of the various stakeholders together to make decisions about how much noise will be allowed in a community from any proposed major development project, regardless of how that project is funded. However, this process will be most effective when it is used as part of a larger national noise management program. Significant work will be required at the various political levels from the national level down to the local level to implement these concepts. In general, however, more responsibility and authority for environmental noise management needs to reside at the local community level in the future, although better technical tools and knowledgeable support for local decision-making are required. A more extensive discussion of the EIAP concepts briefly presented here can be found in a previous publication by Finegold [4].

2.3 Land Use Planning and Local Action Plans

Development and implementation of a local action plan, based on an understanding of the local noise environment and the public's priorities, involves using the most appropriate tools to seek acceptable, affordable, and technically feasible solutions (both short-term and long-term plans). A well-designed survey of public opinion, using a questionnaire technique, should be used as a

significant input to the planning process. It will also be important to monitor the local environment and redirect noise control efforts through adaptive management (e.g., community surveys every five years, and use of a local noise control board). Land use planning is still the most effective and, in the long run, least expensive tool available to local officials and the communities they represent. It is always less costly to design an urban environment with noise exposure in mind than it is to retrofit buildings, highways, etc. Of course, better control of noise at the source will always be the best solution, but this is not always practical, especially when there are many different sources in combination which contribute to community noise problems.

2.4 Local Noise Ordinances

Other tools available to communities include implementation of a technically adequate, understandable and easily enforceable local noise ordinances. With proper support from the technical community, it is be possible for most communities to have effective local noise ordinances. As described by Finegold and Brooks [5] an American National Standards Institute (ANSI) Working Group is currently developing a new ANSI Standard with a model community noise ordinance. Special interest groups often put sections of municipal codes online even if the city itself has not done so. For example, the Noise Pollution Clearinghouse provides noise ordinances for many U.S. cities, including New York and Los Angeles (http://www.nonoise.org/lawlib/cities/cities.htm). Practical information on drafting local noise ordinances in also available on the web, such as at: http://library.lp.findlaw.com/articles/file/00576/003766/title/Subject/topic/State,%20Local%20%20Municipal%20Law_Land%20Use%20%20Zoning/filename/state,localmunicipallaw_1_351#intro.

2.5 Complaint Management

The vast majority of communities in the U.S. do not currently have the ability to properly respond to noise complaints from the community. This is unfortunate because a relatively inexpensive complaint management system can be a very cost-effective noise management technique. Just the act of acknowledging and investigating the noise complaints of individuals at least shows the community that their local government is concerned about the welfare of its citizens and that they sometimes do have legitimate complaints that need to be addressed more formally. In the event that the complaint cannot be readily resolved, each community needs to have a Dispute Resolution Board. This Board would be tied to the legal system and would use existing formal rules of arbitration. The final decision of the Board would be binding on all parties. A Dispute Resolution Board would also handle most of the noise problems that result from non-compliance with the local noise ordinance.

2.6 Neighbor and Neighborhood Noise

One of the more difficult issues to address concerning community noise is that of neighbor and neighbourhood noise, including domestic noise [6, 7]. The comprehensive review of European legislation and practices related to this topic [6] is particularly useful in understanding the challenges to managing this major source on community noise disputes. This report recommends that the following become the cornerstones of new practices in this area: (1) integration of local authority efforts, (2) mediation, and (3) education. Obviously, it will be beneficial to focus on positive ways to mediate neighbour and neighbourhood noise, rather than having community residents simply resort to legal action as their first recourse. Although there will be no simple solution to this problem, it is certainly deserving of more attention in the future.

2.7 Providing information to the public

Another controversial topic in community noise is that of providing information about noise exposure to the public. Fortunately, there has been a lot of progress in this area over the past decade and most governments now see the value of taking this issue seriously. However, because acoustic information is quite technical, it is important to provide this information in form that is easily understood by the public. As an example, the experiences in developing a new runway at the Sydney, Australia airport are leading to the development of new concepts and tools to do this [8, 9]. Obviously, much more work is needed in this area, but the Australian Transparent Noise Information Package (TNIP) is an excellent example of programs that are moving in the right direction.

2.8 Other Support Requirements

Implementation of the concepts presented in this paper will require considerable support from both the government and the engineering and scientific communities, including the following:

- Need improved coordination of national noise policies with regional and local noise policies and programs
- Need relaxation of the "Preemption Principle" in many countries in order to delegate more responsibility and authority for noise control to the regional, State and local levels
- Need coordination of emission and immission noise policies (should focus on the total environment)
- Need appropriate technical support for regional, State and local authorities working together
- Need a process for negotiation and compromise between involved parties (i.e., the "stakeholders")
- Need support for continued research on the effects of noise and development of new noise control technologies
- Need adequate public education/awareness programs
- Need incentive programs at the Federal, State and local levels of government for low-noise products and industries

Several earlier reports of the Organisation for Economic Co-operation and Development (OECD) offer excellent guidance for noise management strategies for communities which are still quite useful today [10-12]. The 2000 World Health Organization report on community noise [13] also provides useful guidance on noise management. Many of the issues addressed in the current paper, plus additional related topics, are also discussed in recent papers by Finegold [14-15].

3 SUMMARY

Deciding on the most effective noise control option is not just a matter of defining legally required noise exposure criteria and mandating action plans to achieve these required noise levels. There are often multiple, conflicting perspectives among the various stakeholders involved in the resolution of community noise issues that must be resolved to achieve effective solutions.

A brief introduction was given to the evolving concept of "Community-Based Environmental Noise Management". This concept involves the use of a variety of proactive and reactive noise management tools as part of an overall environmental planning program. Use of all the available tools described here would provide a total "system" approach to managing noise environment at the community level. An expanded environmental noise impact assessment and mitigation process can be a major tool in this effort, although the mainstays of local noise management should always be land use planning and control of noise at the source. It is hoped that the concepts presented here will continue to be discussed and expanded upon in the future.

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