

Noise Annoyance

A Socio-Political Approach

Noise annoyance, or noise pollution, is one of the major sources of conflicts with regard to air mobility. Usually, noise annoyance is explained by the acoustic load: the amount of sound people are exposed to. But, there is a significant body of research that points to non-acoustical sources of noise annoyance. In issue 37 of *Airlines Magazine* (June 2007), I presented results of my own research that show that noise annoyance is triggered and shaped by noise annoyance policy itself. People living near Amsterdam Schiphol (The Netherlands) and Zurich Kloten (Switzerland) perceive similar amounts of aircraft noise differently. This difference in perception can be explained by the influence of local noise policies on people's perception, as non-acoustical aspects strongly influence noise annoyance. These results are put into a global perspective in this article.

By Christian Bröer

Interestingly, countries that have a long tradition of acoustic noise policies – like the Netherlands, Switzerland, Germany, England, and USA - have not fully solved the noise annoyance issue. Most Western airports repeatedly cause social conflicts about noise. Although sound pressure levels often do not rise or even decrease, citizens are nevertheless highly annoyed. It seems that it takes less and less noise to annoy citizens. Still, developing countries such as China or Brazil adopt the acoustic approach. There are already signs that the acoustic approach does not fully solve the noise problem in those countries either. Instead of implementing and standardizing the originally western acoustic approach, one should approach aircraft noise in a way that encompasses non-acoustic factors, as noise annoyance is a socio-political phenomenon. Annoyance depends on social relations, political conflicts and culture. A socio-political approach leads to a different noise annoyance policy, one that is much more attuned to local or national circumstances and that addresses the relation between policymakers, industry and citizens. This affects the scientific research agenda as well. To build a comprehensive theory of aircraft noise annoyance, we need a different kind of research.

A Socio-Political Approach of Noise Annoyance

A growing number of airports around the world is faced with protests and conflicts that are often about noise annoyance. There have been attempts

to define and to tackle aircraft noise annoyance through international organizations such as the International Standardization Organization (ICAO), the International Institute for Noise Control Engineering, the World Health Organization (WHO) and the European Union (EU). Noise policy within the European Union is increasingly converging, whereas more and more non-EU countries have started to develop noise policies that roughly resemble those in Europe and in the United States. The main idea of those policies is to regulate the sound at its source and at the moment it reaches people, and thereby regulating noise annoyance. Annoyance would thus depend on the amount of sound that people are exposed to. This is called an acoustic approach and this approach is increasingly adopted around the globe. China, for example, has rapidly developed strict noise policies, especially since the 1996 "Law on Prevention and Control of Pollution from Environmental Noise" (Tian 2007). India, Mexico, Brazil, Egypt, Oman and other nations are implementing an acoustic approach too. However, the acoustic approach neglects a number of findings about noise annoyance.

In the previous issue of *Airlines Magazine* (issue 37, June 2007), I summarized research findings that demonstrated that 'non-acoustical factors' strongly correlate with annoyance. Major factors that increase annoyances are distrust towards authorities, fear, and the idea that exposure to noise

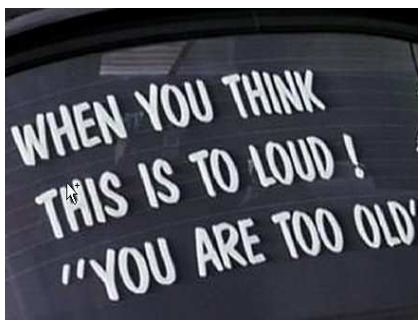
cannot be controlled. The political process itself is particularly relevant, because, therein, sound is defined in such a way that it affects the perception of people. The way aircraft noise is defined in noise policy explains why people in the Netherlands experience the same amount of sound differently than people in Switzerland (Bröer, 2006; Bröer, 2007). More generally speaking, a socio-political approach has three elements.



Picture 1: Courtesy of Peter Nicholson

First of all, people evaluate what they hear as part of a *social relation* (Stallen, 1999). For example, if people trust their authorities that they do everything they can to protect their citizens against unnecessary noise, then, people will accept greater amounts of noise more easily. Procedures that people experience as 'unfair' will increase annoyance (Maris et al., 2007). Non-acoustic factors are, in fact, part of a changing social relation.

Secondly, *power and conflict* are part of social relations. When we speak of annoyance, it automatically entails the question of who has the right to make noise, and who controls the soundscape. The picture below, which shows the back of a so-called ‘boom car’, is an example of small-scale conflict about who controls the sound in the public space. The author of the text claims that he/she is entitled to publicly play very loud music.



Picture 2: Back window of a “Boom Car” Provided by Christian Brøer

This statement is an expression of a small-scale conflict. When it comes to airports, though, larger conflicts are happening. Airport expansion is often presented as a necessary development. This empowers the airport industry, and reduces the options of people to control the soundscape.

Third, people evaluate sound in relation to what they already know: values, religion, previous experience, symbols or, in general, *culture*. People who live in a culture in which privacy in one’s house is highly valued will evaluate incoming noise more negatively than those who live in a culture in which the home is less secluded. Dubois and Guastavino show that urban sounds have specific meanings to people, depending on the “subjective factors such as previous knowledge (whether it be expertise or common sense), social practices, motivations and attitudes towards noise” (Dubois & Guastavino, 2006).

Altogether, sound is much more than a simple acoustic phenomenon. It is a socio-political phenomenon, which is until now only partly understood. In order to advance our understanding of it, I will make some suggestions below, but let us first explore what a socio-political approach means for noise policies.

Noise Policy

In the previous Aerlines magazine, I already briefly mentioned how non-acoustic approaches feed noise policy. I want to elaborate on this now. I am not advising a certain kind of measure, but rather a different approach.

First of all, let us redefine annoyance. A global approach to noise annoyance should be broader than the acoustic approach. There are historical, cultur-



Picture 3: Noise measured by policy. Courtesy of HSE UK

al and political differences between countries and regions that affect how people perceive aircraft sound. People’s perception depends on the socio-cultural context. The perception of people should be at the heart of annoyance policy, as opposed to sound pressure levels. It is therefore problematic to devise a single noise policy that is implemented in different settings. Instead, noise policy needs to address the specific social, cultural and political situation around the airport in question.

Aircraft noise annoyance is treated as an isolated acoustic phenomenon. Instead, it is much more realistic to approach aircraft sound in relation to other sounds. More importantly, as I have stated above, sound is a social phenomenon. Conflicts over land-use, economic development, the relationship between citizens, politicians and industry and ecology, they all influence noise annoyance policy and people’s perception of aircraft sound. The situation is even more difficult, if we realize that noise policy itself is one of the factors that shape people’s perception. Annoyance is, in part, a conflict between authorities and their citizens. Therefore, noise policy has to be policy about the interaction between them as well. Starting from a socio-political point of view, one would not choose

sound pressure levels as the most important indicator for annoyance. The number of people that report annoyance is a much more straightforward and much more a reliable indicator than sound pressure levels.

Second, criticize taken-for-granted assumptions. Let me point out two of them: (A) The basic assumption of noise policy in many countries is that economic development should not be



Picture 4: Spotting the A380. Courtesy of Albspotter

hampered by noise policies. Economic progress is often presented as a given. Instead, we might ask ourselves if noise abatement measures always hamper economic progress. And we might also ask ourselves if it would not be worth paying a price for implementing a different noise policy. Strict measures against sound exposure (e.g. a night curfew, or a standstill in the number of flights) could restore trust in noise policies, especially where airport expansion has led to a long series of conflicts. (B) The second assumption that can be questioned is the necessity of noise annoyance policy. Politicians or citizens could raise the question of how much noise is actually too much. At present, this question is hidden behind limit values, contours and dose-response relations. But, as we have seen, the acoustic approach is limited. It needs a political or normative point of view to judge just how much aircraft sound we want to hear. Citizens, as well as politicians or other interested parties, can decide on that. Countries without a noise policy might first investigate whether aircraft sound is a problem to those in the direct vicinity of the airport, in what way it might be a problem, and which specific local policies might address this.

Future Annoyance Research

As Fidell has pointed out, current annoyance research often lacks a comprehensive and convincing theory (Fidell, 2003). We should work towards a theory that integrates socio-political processes and sound exposure. The type of research that is needed for this should encompass the following aspects:

Perception-oriented: noise annoyance as it is perceived by people is the primary focus.

Comparative: to understand how noise is perceived in one place, it is helpful to compare this to different places.

Process-oriented: annoyance develops over time and in interaction between humans. Therefore, a longitudinal (panel or cohort) study is in place.

Qualitative and quantitative: we need different kinds of research methods, ranging from experiments to in-depth interviews.

To develop and test a theory of socio-political annoyance, research that is comparable to what Kroesen (Kroesen et al., 2007) or myself have done (Bröer, 2007) might be considered. More specifically, we can think of a number of different research projects. An international comparison of the meaning that people attach to aircraft sound. In the past, some cross-cultural quantitative research has been done, but we need more qualitative work since the meaning of aircraft sound has only been partly understood. Once we have a better understanding of relevant variables, then these can be included in experiments and questionnaires.

Research on how the EU enlargement process influences noise annoyance perception in new member states. If policy processes affect people's perception of aircraft sound, we should then be able to observe changes in countries where EU policy is implemented.

In the same vein, we can research the effect of newly developed noise policy



in areas where there had not been any noise policy before.

Study the interaction between politicians, industry, social movements and citizens, to understand the mechanisms in which sound perception is shaped.

Study the effect of (the assumption about) economic development, politics and culture on noise annoyance policy.

Conclusion

Politicians often complain that people have worried more about aircraft noise after noise abatement policies have come into effect. Countries with the most elaborate noise policies face massive protests. Even in places where sound pressure levels are decreasing, citizens complain. In many western countries, noise annoyance is now an issue in areas that were considered silent 30 years ago. The spread of the acoustic approach to annoyance seems to lead to the same kind of problems in other countries. The next international conference on noise control, which is held in Shanghai in 2008, has the telling title 'From silence to harmony'. The director of the Chinese Institute of Acoustics recently stated that his government successfully regulated sound emissions, but people were more dissatisfied with their acoustic environment than ever before. While it is possible to limit sound exposure, this often does not lead to less annoyance, protests or complaints. From a socio-political perspective, this does not come as a surprise. Noise policy also legitimizes complaints and directs people's attention. A socio-political approach to noise annoyance includes acoustical and non-acoustical factors of noise annoyance in a dynamic perspective. The question is how and under which social, political, economic and cultural

circumstances aircraft sound is turned into annoyance. This does not deny that, on average, more sound causes more annoyance. But this relationship needs to be put into a broader socio-political perspective. Global noise policy presupposes a better understanding of the local social and political processes in which annoyance arises.

Reference

- Bröer, C. (2006), *Beleid vormt overlast, hoe beleidsdiscoursen de beleving van geluid bepalen (policy annoyance, how policy discourses shape the experience of aircraft sound)*, Amsterdam, Aksant.
- Bröer, C. (2007), 'Noise annoyance and policy: how policy shapes non-acoustical factors', *Inter-noise 2007*, Istanbul.
- Dubois, D. and Guastavino, C. (2006), 'From language and concepts to acoustics: How do people cognitively process soundscapes?' *INTER-NOISE 2006*, Honolulu Hawaii.
- Fidell, S. (2003), 'The Schultz curve 25 years later: A research perspective', *Journal of the Acoustical Society of America*, 114, 6, 3007-3015.
- Kroesen, M., Molin, E.J.A. and Van Wee, B. (2007), 'Understanding aircraft noise annoyance and the (in)effectiveness of Dutch aircraft noise regulation', *Inter-Noise 2007*, Istanbul.
- Maris, E., Stallen, P.J., Vermunt, R. and Steensma, H. (2007), 'Noise within the social context: Annoyance reduction through fair procedures', *Journal of the Acoustical Society of America*, 121, 4, 2000-2010.
- Stallen, P.J. (1999), 'A theoretical framework for environmental noise annoyance', *Noise and Health*, 3, 69-80.

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