Shaping up our 'soundscapes' can improve our lives

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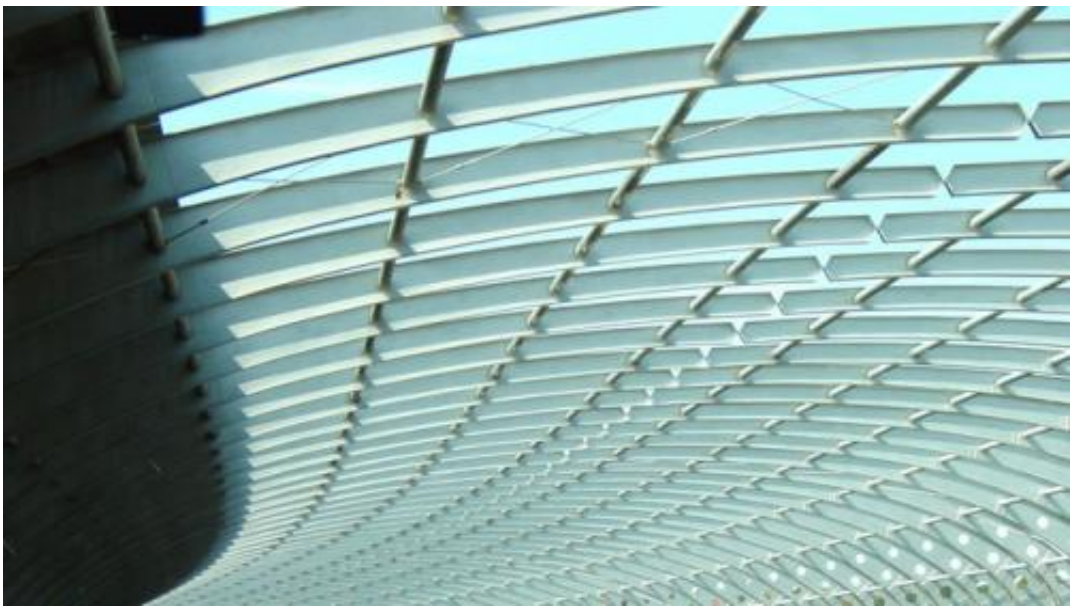

The Sound Tube in Melbourne, Australia is designed to reduce road noise. Credit: Wikimedia, CC BY-SA

We live in an increasingly noisy world. Since even low-level noise can affect quality of life, new tools to deal with noise are welcome. "Auralisation", the audio equivalent of visualisation, is now helping to model and improve the sound of our living and working spaces, as well as recovering the acoustics of past environments.

According to a 2009 UK Health Protection Agency report, nearly a third

of people express dissatisfaction with the noise in our environment. Roads, trains, aircraft, and open-plan offices all contribute to an increasingly loud world. Although these sounds are not loud enough to directly damage our hearing, environmental noise is one of the main reasons given for complaints of environmental distress. More than 30% of the EU population is exposed to noise levels above the World Health Organisation's recommendation.

The soundscape of our environment helps us to better understand the world we live in. Sound can have a direct affect on our health and well-being. Human society has battled with the concept of excessive noise throughout history. It is not just volume – the complete absence of sound in our environment can be equally unsettling. If the presence of sound, both wanted and unwanted, is something that cannot be avoided, how might we design our environment with a view to improving sound quality rather than reducing sound quantity?

Auralisation – the audio equivalent of digital visualisation – enables us to listen to virtual acoustic environments that have only existed in the past, that are about to be built, or that are purely fictional. It is an important tool in helping us to improve the quality of our sound environment. Current research in the AudioLab at the University of York is investigating new methods to improve how auralisation is both implemented and delivered.

The noisy world we live in clearly has a negative impact on our lives – and this is by no means a new problem. Auralisation research will help us to design environments with a more carefully considered sound quality and encourage all of us to engage more positively with our everyday soundscape.

Architectural soundscapes

Auralisation is a now key part of the modern architectural and environmental engineering design process. The techniques used enable proposed buildings and spaces, from concert halls and classrooms, to major interventions in the landscape and countryside that surrounds us, to be auditioned and tested for the acoustic impact such developments will have on our day-to-day lives.

Applying that approach to open-air environments, however, presents its own distinct challenges. A concert hall is an enclosed space. The outdoor soundscape can be much more complex, consisting of traffic, aircraft, birds and people talking. Some of these sounds can travel over significant distances, interacting with much a more complex environment. This can be much more difficult to simulate accurately and interactively so that the listener feels that they are part of the virtual environment. The science of auralisation is now reaching the point where we can get this correct, and produce believable virtual experiences.

Aside from helping to improve the design of our sound environment, we can also use auralisation to help us engage more positively with our soundscape, through collaborations with artists, historians and archaeologists, as well as the creative industries.

For instance, in the Re-sounding Falkland Project we helped artists David Chapman and Louise K Wilson in the acoustic reconstruction of the now ruined Temple of Decision, based on information we obtained from the remains of the site, and what documentary evidence could be found in various archives.

A similar ongoing project – on a much larger scale – is the acoustic reconstruction of St Mary's Abbey, York, working with archaeologists, historians and the curators at York Museums Trust, we are refining our 3D acoustic model to recreate once more what this grand Abbey Church

sounded like for the first time since its dissolution in 1539. More recently we have been working with computer games company Codemasters to make their in-car driving games sound more realistic and immersive.

Auralisation can give politicians and policymakers a valuable new perspective on the impact of important infrastructure developments, such as rail, road or airport developments. We also use these methods to produce new music, make computer games more immersive and exciting, and produce new artwork. Auralisation can even help to bring past environments to life, through a better understanding of the sound world that would have existed at the time.

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