

audible architectural models

soundscapes: essential qualities of architectural space

An increasing awareness of the sounds in our cities raises new questions regarding the way we plan and build our environment. Notwithstanding the increasing interest amongst architects and designers of the acoustics of our urban areas, however, the actual methods for developing and containing sound remain relatively unexplored within architectural practices. Even when acoustical qualities are brought into focus, sketches, plans, calculations and models remain silent.

A dependent on mute tools alone reinforces an already existing detachment from the specific site. The designer acts, decoupled from the perceptible sonic experience, and is deaf towards the specific soundscape which the designed space will create. Nonetheless, it is the complex structure of of everyday sounds that to a great extent contributes to spatial identity.

We listen to space as multilayered actions taking place. In relation to the very location of the listener, the interplay of everyday sounds manifest surface qualities, structural parameters, functional relations and spatial transition. Since sounds can also reveal the time of the day, the weather and even the time of the year, they introduce these ephemeral parameters as tools to shape soundscapes and as intrinsic qualities of architectural space.

We therefore aim to promote the awareness of the sonic consequences of architectural planning and to implement sound itself as a basis of the design process.

sound models as an architectural media

In our work and our teaching we develop sound models to aurally communicate architecture. The models are not exact auralisations but sonic sketches generating a specific spatial imagination that make certain atmospheric impressions audible. We propose to use them in discussion with clients, colleagues or even acousticians in order to define basic requirements at the preliminary design stage.

By sound models, we mean stereo-recordings of sounds edited for an architectural proposal, listened to via headphones or loudspeakers. The recordings are made at the site but also in spaces with sounds or activities similar to the proposed soundscape. The process of editing these recordings means cutting and mixing the sounds in order to reconfigure those spaces; by doing so the new space is made audible. With the use of audio effects, acoustical characteristics can be modified to test different proportions and materials.

typologies of architectural sound models

We can distinguish three specific typologies within architectural sound modelling – although each model could be assigned to more than one singular typology.

A first type of model documents spatial qualities from a fixed physical location. This method of creating a constant audible sound-perspective enables the listener to grasp acuity in detail. Additional sound perspectives can be compiled in a way similar to a set of architectural elevations. By comparing contrasting moments in everyday use, these models can highlight shifting atmospheres referring to different activities in the very same space.

The second type of model presents an architectural proposal through real-time sound-walks through space. The listener follows a protagonist through his or her particular activities, such as driving, walking or talking. Specific spatial qualities are revealed by the protagonist's interactions. These models enable the listener to enter a larger area of the design and emphasise functional relations and the changing atmospheres of spatial sequences.

Finally, a third type of model is the linking of fragments of different places and times to create a characteristic sound-collage. This kind of model is still a continuous sound file, however, its nature is comparable to rather abstract media such as mappings or section drawings. Temporal and spatial breaks and ruptures are used to generate multilayered experiences. This method of cutting and pasting key scenarios is particularly suitable to manifest elementary atmospheric qualities of the architectural design.

using sound models in practice (an example)

In our work we have used sound models to design a reading hall (a lounge for reading, to do homework, access to periodical papers and magazines) for a secondary school. From our own experience we noticed that the acoustic surroundings of libraries affect the way that people manage to retreat for concentrated reading. We therefore analysed recordings from different places where people were reading – not only libraries, but also in book shops, on local trains and in public spaces.

Rather than just volume, other sound characteristics create appropriate acoustic surroundings for reading; in particular, how single sound events are appreciated and how these sounds relate to each other. Some main characteristics of a positive reading soundscape would be

- a spatially wide sound-spectrum, where you can hear distant sounds as well as very near ones.
- sound that seems to be caused by rather calm activities.
- sounds that are reliably periodic and steady, with no abrupt changes.

We then recorded sounds from the school, which we assumed were likely to be heard in the new reading hall. Since the hall was meant to be the heart of the school we were operating with lots of potentially disturbing sounds, such as students running around and shouting.

Having defined the operating principles for adequate sound-spheres we mixed our school recordings, trying to achieve a sound model for the reading hall with similar positive characteristics. Instead of minimising the sound level, our strategy was to add complementary sounds – activities – which would help to present the expected turbulent sounds in a different and calmer way. In the entrance zone for example, we located a sitting area with couches where students gather and chat. As a result the calmer sounds of talking while sitting mix with the turbulent sounds of students walking by. Thus the acoustic surrounding as a whole appeared to be calmer. We added a small cafeteria nearby that contributed the constant rattling of dishes, complementing very well the rumbling sound of bags being thrown on desks or floors. We also made the outside walls more permeable for traffic sounds to spatially widen the audible sound-spectrum.

Here sound models were used in an early stage. They are first sketches to be discussed with the client in order to define the basic requirements of the preliminary design.

Specifically, we composed two models: one morning scene and one afternoon scene. These two different sound perspectives made it possible to reflect the use of this hall both during school lessons and when used for free-time work in the afternoon.

further intrinsic advantages to using sound tools

Because of their multifaceted approach, sound models are capable of expressing both commonly unregarded and difficult to communicate needs. Examples of works created in our latest seminar illustrate this ability.

In Adriana's 'Fragments of a City campus' the sound of stairs emphasise the spacious depth and liveliness of a central hall; whereas in Tomme's auralisation 'my nature tunnel' the climbing of stairs – triggered by the rhythm of steps and the character of surface material – generates an airy, relaxing sensation.

Ida's work, 'Every door is an opportunity', plays with the moment of surprise when opening a door and entering another room. This sound piece takes the listener on a tour through various spatial transitions. Familiar sounds from different surroundings are blended together in a continuous sound trip though our everyday life — for instance, the sound of the opening of doors in the subway turns into the rattling of keys when passing through an apartment door. The recording makes

the listener question whether these familiar sounds make us anticipate what lies behind the door. Are they the fitting frame for the upcoming event? Do particular sounds make us feel a slight moment of hesitation while passing the threshold before entering a new space? The work easily illustrates how the sound of doors affects the atmosphere of a space.

In contrast, Bastian's 'short cut' ignores doors and windows but lets the listener aurally pass through walls and ceilings, adjacent but structurally disconnected spaces are being compared. The auditory consequences of strictly separated rooms and spaces come into question: in how far do sonic separations (or sonic connections) affect the use and thereby the soundscapes of those spaces?

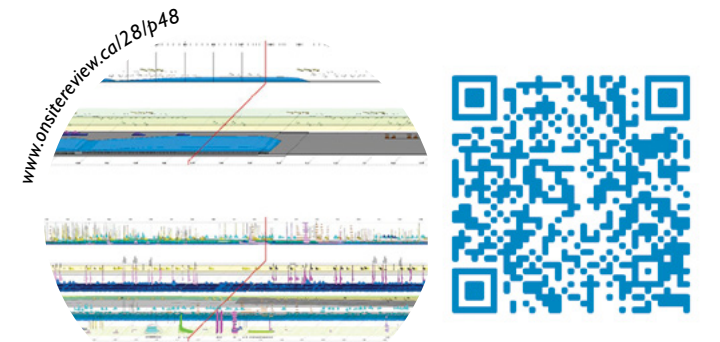
Even subtle and rather ephemeral qualities of space are the subject matter of sound models, which in our experience are difficult to express by conventional architectural tools.

conclusion

We see a necessity to make sound part both of the intention and the tools of architecture.

Since sound models give the impression of full scale mock-ups, their high precision in detail allows an extensive and multi-layered sense of the designed architectural situation. The special nature of the sound model allows us to work with the actual experience of space. Not only do they extend the tools of architectural planning but they also help designers to understand the sonic consequences of their work.

Even in untrained listeners sound models provoke an immediate sense of architectural design. They circumvent traditional codes, such as architectural drawings, which can be difficult to read for lay persons. Working with sound auralisation would enhance user participation in the designing process – a matter we hope to investigate further in the future. ✎



Sound files included: Adriana Osanu, Ida Lautanala, Reading Hall afternoon, Reading Hall morning