Curating Sound/Designing Place

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Abstract

Acoustics is one of the related disciplines taught in architectural studies. This paper discusses that the acoustic study in architecture can be more than defining the spatial proportion and calculating the effects of material selection in order to create the acoustic room. By treating acoustics, or to be more specific, sound, as another type of materials, architects can explore the other dimensions carried within the sound's characteristics and soundscapes into the design. The given examples, drawn from experimental sound design exhibitions, shed light on the idea that the combinatorial curated sounds and designed spaces can work in tandem to redefine a place, becoming a 'place-making' tool. Thus, the outcomes of the process can be both cultural and functional as they are able to illuminate the sensory perception which in turn help create the experiences which is one of the fundamental roles of architecture.

Keywords: Architectural Acoustics, Cultural Material, Sound Design, Place Making

Common architectural acoustics

Architectural acoustics is a sub-discipline in architecture. It is commonly studied as a subject in technological courses. The study mainly concerns with sound control of buildings, i.e., the transmission of sound within the enclosed spaces as well as the immediate open spaces surrounding the buildings. Acoustical Society of America, an international scientific society of those who work in acoustics founded in 1929, points out in their main webpage that: *'Good acoustical design ensures the efficient distribution of desirable sounds as well as the exclusion of undesirable sound'* (Acoustical Society of America (ASA), 2013).

The functionality of sound in acoustic design for architecture can be summed up for two main purposes: desirable hearing and comfort (ASA, 2013; Paradis, 2013). For example, theatres, auditoriums, or lecture halls have to have a good acoustic environment in order to hear the sound quality conveyed, speech or musical likewise. Offices or homes should have comfortable sound; otherwise productivity can be compromised, and in some cases leading to sickness. Depending on the varieties of functionality and comforts within spaces in relation to activities, the acoustic qualities or acceptable sound levels are usually given in ranges in relation to the measured categories. The common are: criteria of acceptable background sound levels and criteria of acceptable degrees of sound isolation from exterior sources (high noise level areas) as well as from sources within a building (equipments and mechanical systems), and so on (Cavanaugh and Wilkes, 1999: 36-44). Some examples given by Cavanaugh and Wilkes (1999: 38) suggest that the maximum recommended background noise criteria (NC) and background sound level for opera and music performance and recital halls, and radio and recording studios are at 20 curve and 30 dBA, while for private bedrooms in residences or hospitals the recommended background noise criteria and background sound level range from 25-35 curves and 34-42 dBA. As for kitchens or laundries, the recommended background noise criteria and background sound level range from 45-60 curves and 52-65 dBA.

To achieve a good acoustic design of an enclosed space, there are four major factors: shape of the space, proportion and volume of the space, materials fitted for all the surfaces of the space, and the equipments within or surrounded the space, for instance, furniture, air-conditioning system, etc. These factors are concerned with the transmission of sounds, from sources to paths and to receivers (Cavanaugh and Wikes, 1999: 2). To understand the extent to which the transmission of sound will

behave from the application of the room's materials, and in some cases furniture, equipments and so on, will result on the responding design for the acoustic qualities of such enclosed space.

These factors will then be calculated through a number of formulae to give the sound characteristics of the space, for example, sound reflection, sound absorption, sound diffusion, and so on. In some cases, there can be the conflicts of between the sound characteristics, for example, sound absorption and sound reflection. Glass material has a high sound reflection index but a low sound absorption index. In contrast, carpet has a low sound reflection index but a high sound absorption index. The results of this calculation process will be compared to the acceptable sound criteria. If they fall within the acceptable ranges, then the space should have the acceptable acoustic quality for functionality and comfort of such space. If they result do not meet one or some of the criteria, those factors will have to be reconsidered, re-selected and redesigned so that the acceptable sound criteria can be met, and normally within the construction budget. Fig. 1-3 demonstrate some of the acoustic calculation and the interior design for an acoustic room (un-related).

Surface Name	Area	Absorption Coefficient	Area x Absorption Coefficient	Construciton Name
ZN1-BEAM1-BOTTOM	2.008	0.740	1.486	Ceiling 1
ZN1-BEAM1-EAST	0.855	0.740	0.633	Ceiling 1
ZN1-BEAM1-WEST	2.114	0.740	1.564	Ceiling 1
ZN1-BEAM2-BOTTOM	1.360	0.740	1.006	Ceiling 1
ZN1-BEAM2-SOUTH	3.285	0.740	2.431	Ceiling 1
ZN1-CEILING-A	8.305	0.740	6.146	Ceiling 1
ZN1-CEILING-B	8.190	0.740	6.061	Ceiling 1
ZN1-DN1	1.600	0.150	0.240	Door 1
ZN1-DN2	1.121	0.150	0.168	Door 2
ZN1-DN1-FRAME	0.245	0.100	0.025	Door Frame 1
ZN1-DN1-FRAME-LEFT	0.050	0.100	0.005	Door Frame 1
ZN1-DN1-FRAME-RIGHT	0.050	0.100	0.005	Door Frame 1
ZN1-DN2-FRAME	0.210	0.100	0.021	Door Frame 1
ZN1-DN2-FRAME-LEFT	0.043	0.100	0.004	Door Frame 1
ZN1-DN2-FRAME-RIGHT	0.043	0.100	0.004	Door Frame 1
ZN1-FLOOR-1	15.079	0.100	1.508	Floor 1
ZN1-FLOOR-2	4.320	0.100	0.432	Floor 1
ZN1-FLOOR-STAIR-1	0.683	0.100	0.068	Floor 1
ZN1-FLOOR-STAIR-2	0.511	0.100	0.051	Floor 1
ZN1-FLOOR-STAIR-3	0.683	0.100	0.068	Floor 1
ZN1-E01	4.704	0.670	3.152	Wall 1
ZN1-E02	3.850	0.670	2.580	Wall 1
ZN1-N01	3.771	0.670	2.527	Wall 1
ZN1-N02	1.125	0.670	0.754	Wall 1
ZN1-N03	3.950	0.670	2.647	Wall 1
ZN1-N04	6.879	0.670	4.609	Wall 1
ZN1-S02	13.246	0.670	8.875	Wall 1
ZN1-W01	0.562	0.670	0.377	Wall 1
ZN1-W02	8.505	0.670	5.698	Wall 1
ZN1-W03	0.570	0.670	0.382	Wall 1
ZN1-S01	0.563	0.670	0.377	Wall 1
	96.478	Σa - Opaque	53.901	

Fig. 1: an example of the calculation for all the materials being applied for the internal surfaces of a room. Please be noted on the areas, the design elements and the absorption coefficient.

source: Prechaya Mahattanatawee

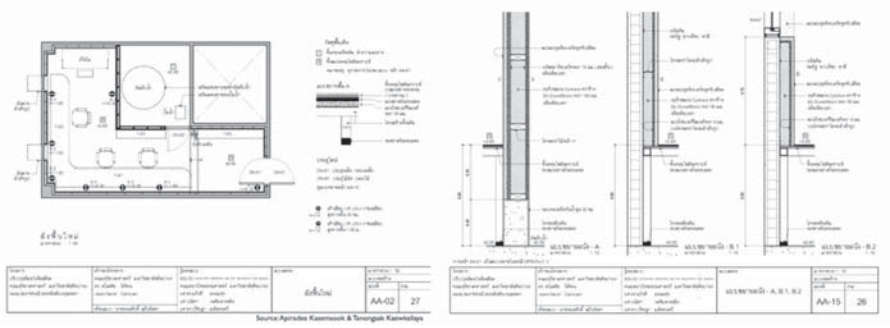

Figure 2a *Figure 2n*

Fig. 2: a and b are a floor plan and some wall sections of a make shift recording room which locates on the top of a building with two ceiling attached air conditions and next to an auditorium, an elevator, a water tank and its pump room. A layer of dried walls has to be added to the existing walls as well as a raised floor and an additional door in order to control the noise from the surrounding. Furthermore, to reduce the noise from the vibration of the water tank, the pump and the elevator, a number of elastic rings are applied to point loaded position of the raised floor. (Source: Apiradee Kasemsook, Prechaya Mahattanatawee and Tanongsak Kaewkallaya)

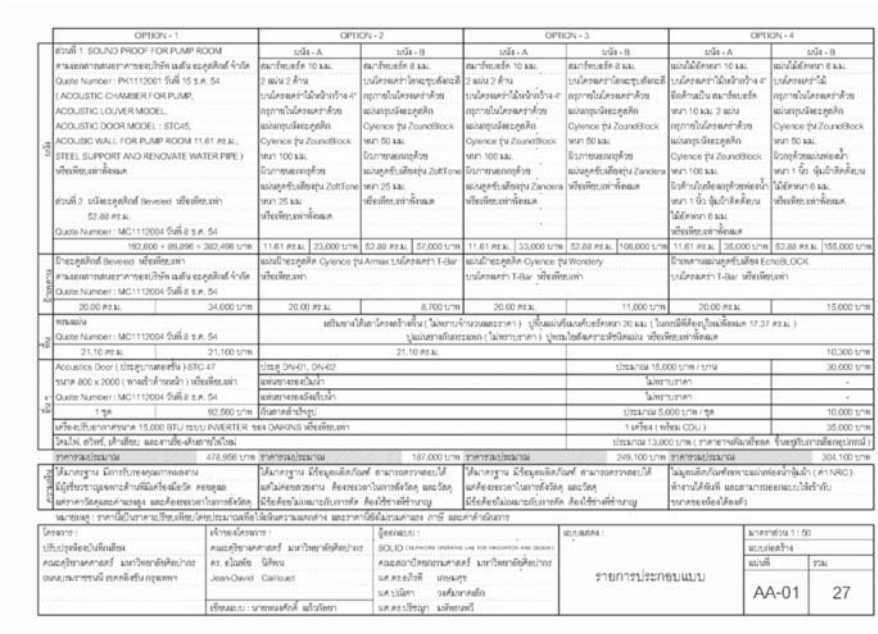

Fig. 3: is the comparative construction estimations of the recording room for different types of material selected from one company.

source: Apiradee Kasemsook, Prechaya Mahattanatawee and Tanongsak Kaewkallaya

As for the exterior or open space, there are two more factors for considering. One is the distribution of the building masses. The other is the effect of the external sound source. The concern for exterior space has less to deal with acoustic quality, but more to do with noise control, i.e., noise pollution. For the distribution of the building masses, the material of the building facades should be considered for the transmission and reverberation of sound, not to make noise pollution. As for the effect of the external sound source, the impact of the airport is a strong example case: the sound path of the airplane when taking off and landing. London Heathrow Airport allows the air traffic until midnight to control the noise pollution for the communities locating nearby. In the case of Bangkok, Airport Authority of Thailand had to relocate and subsidise the construction of a number of houses locating along the flight sound path of Suvarnabhumi Airport. For the buildings that cannot be relocate, for example, King Mongkut's Institute of Technology Ladkrabang's buildings, the interior of their lecture rooms, auditorium and so on have to be refitted with acoustic materials to prevent the external sound while all the normal activities can continue as usual.

Experimenting with sound, memory and space

As a supporting discipline in architecture, the general knowledge relating to sound or acoustic design is usually fells a bit short for two reasons: uninteresting on the knowledge based on its own scientific research within the field and a lack of critical theories to lead the application forward. Physicists claim that they have a better understanding of the sound behaviour, while engineers says that they are better in terms of calculating the acoustic control of the space and the development of acoustic material. It is obvious that their roles cannot be denied, but the role of architects should not limited to the design of acoustic rooms. In trying to extend the role of architects in acoustic design, it is worth to start from the fundamental: to what extent sound could be treated or dealt with as a medium or a material.

Let's try to find some answers for this question from two examples. In December 2008, a group of three curators -- each from the Faulty of Music (Anothai Nitibhon), the Faculty of Painting, Sculpture and Graphic Arts (Toeingam Guptabutra) and the Faculty of Architecture (Apiradee Kasemsook)-- experimented with sound as a medium and a material through 12 art works, for an art exhibition, titled 'The Charm of Silpakorn: Art and Sound Installation'. This exhibition was organised as a part of Silpakorn University R esearch Fair, managed by Silpakorn University Institute

of Research and Development. Some of the art works were later selected to exhibit with some adjustment, for an exhibition of the same nature, titled 'Image, Space, Sound', as a part of the 8th Annual Anthropological Seminar, titled 'People, Music and Lives', of the Princess Maha Chakri Sirindhorn Anthropology Centre, in March 2009.

For both exhibitions, sound is proposed to be a medium which should be incorporated with the art piece, to instigate memories of some events or practices. For the 'Charm of Silpakorn', these events or practices should be commonly carried out at Silpakorn University Wang Tha Phra, if possible. They should perhaps form some sort of socio-cultural identities of the university, hence the title. As for the second exhibition, the events or practices were extended to everyday life.

'The Charm of Silpakorn: Art and Sound Installation' exhibited 12 art works which were derived from twelve events, practices and places being essential to the university' Wang Tha Phra Campus (Wang Tha Phra is the original campus of SIlpakorn University). Although the original events and the occurring places are strongly attached, to present the art works of these relationships at the exact locations was somewhat problematic due to the refurbishment of the Wang Tha Phra Campus and the on-going classes during the exhibition period. Majority of the art works installed were dislocated from their specific event-site relationships.

As sound is the key, the framework of the exhibition was set for the collaboration between the staff of the music faculty and the staff of the painting, sculpture, graphic arts, the architecture and the decorative art faculty, except one piece. The staff of the music faculty would be the sound producers, while the staff from the other three faculties would determine the form of the art work and the way in which sound would be incorporated and appreciated. The sound or sounds relating to the events in their occurring places would be recorded, reproduced, altered, introduced, edited, designed and so on. The (new) sound would be represented with the visualisation of the art pieces; the art pieces as a whole would be appreciated by a combination of aural and visual perceptions. In addition, the curators asked for the sound of the exhibited art works to be an interactive part. To elucidate, three art works are explained as examples here: Ming Lee Restaurant by Kongsak Kulklangdong and Promwut Asawasopanakul; Auditorium by Toeingam Guptabutra and Pattarapong Sripanya; and, Krobkru by Apiradee Kasemsook and Anothai Nittibhon and team.

'Ming Lee' is a Chinese restaurant locating next to the university. During the founding period, majority of Silpakorn University's lecturers often hung out in Ming Lee Restaurant after work. Their jokes, discussions, arguments, challenges or collaborations led to the development of and establishing the knowledge of the Thai contemporary arts which has guided and, still, shaped the field nowadays. The sounds and the discussions within the restaurant were recorded. They were edited and presented through a number of small earphones put in a number of small beer bottles, themselves obtained from the restaurant. The bottles were placed in the ML shelf in the university library. ML is an abbreviation of music literature which has very few books. It can also be read as the abbreviation of (M)ing (L)ee Restaurant (Fig. 4). The presentation of sounds here is quite direct, i.e., from one source, and less altered from the ones occurring in the restaurant.

Fig.4: Ming Lee, exhibited in Silpakorn University Wang Tra Phra's Library.
source: Silpakorn University Institute of Research and Development.

Auditorium is the only huge lecture hall of Wang Tha Phra and can accommodate for 300-600 people. It is the first building designed with the longest span in the historical area of Bangkok, i.e., Krung Rattanakosin. This means that the main auditorium hall has no internal column, designated for the unobstructed internal view. It was use as the big lecture hall from 8.30 am-16.30 pm, Monday-Friday, and for all sort of activities for the other time. Underneath the hall are the canteen, the only canteen for students and staff of Wang Tha Phra, and a number of meetings and smaller lecture rooms.

The original idea of this piece came from a popular novel, titled 'White Chair in a Red Room', which is written by an alumni and tells a love story of the university alumni through some descriptions of their usual habits gaining while studying at Wang Tha Pra. In this piece, Pattarapong recorded the sound of the activities associating with lectures and all other activities within the rooms of the Auditorium. It was then edited and reedited for a number of versions. Toeingam set, rearranged and filmed a number of activities in a number of rooms. She proposed some elements of displacement here. The activities were not necessarily the ones occurring within the rooms. Then, the films and the sound were mixed. Toeingam decided to present the work as a series of short film viewed through television set, headphone sets and game consoles. The viewers were asked to watch the films while listen to the sounds. Simultaneously, they could alter the views and the sounds through the game consoles, which sometime the sound could be silence. As mentioned, for this piece, views, sounds, places and activities are reshuffled. Often, they are contradicted to each others. The idea of commonly understanding is questioned here. Both the aural and visual perceptions can be of the expected or the puzzles (Fig. 5).

'Krobkru' is an annual ritual for Silpakorn University's art students. It is an important event for the first year students to signal their inclusion into the art profession community. It is also a unique event that it has to be made on the auspicious occasion, with Buddhist ceremony and Brahman procedure of tradition chanting and music playing. For this piece, the chanting and the music were reproduced and edited. The sounds were presented through a number of speakers, real and fake, placed in a cubicle within an exhibition room. By moving into or within the cubicle, the visitors' movement tricked the sensors to release the sounds. Their movement velocities also dictated the rhythms, the cycles and the overlapping of the sounds from different speakers within the movement ranges. The more number the visitors were in the cubicle, the more sounds were played and heard. By engaging visitors with the personal sound accumulating process to hear some familiar noises, the art work reminded the visitors of the event and the associated place each visitor had made or known this ritual. It also allowed the visitors to write a new sound and be able to recreate their space to engage with the piece, individually or all together (Fig. 6).

Fig.5: A view in the film of Auditorium derived from White Chair in a Red Room novel -- a kind of opposite here.
Source: Silpakorn University Institute of Research and Development.

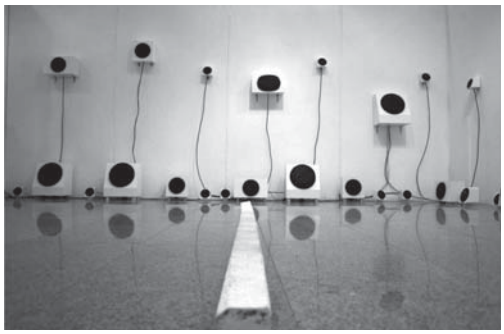

Fig. 6: Krobjru, exhibited in Phra Bromphijit Art Gallery, Faculty of Architecture, Silpakorn University
Source: Warunthorn Jaruputhikorn

Krobkru was modified into Krobkru II which was displayed together with the modification of some selected pieces from 'The Charm of Silpakorn: Art and Sound Installation' and some additional new pieces for 'Image, Space, Sound', an art and sound installation, to be a part of the 8th Annual Anthropological Seminar, 'People, Music and Live' of the Princess Maha Chakri Sirindhorn Anthropology Centre in 2009, under the theme, 'People, Music and Lives'. The exhibition was curated by the same team as that of 'The Charm of Silpakorn: Art and Sound Installation'.

Krobkru II was placed within a stair of the Princess Maha Chakri Sirindhorn Anthropology Centre from Level 3 to Level 4. There are two differences between Krobkru and Krobkru II. The first is that the direction to engage with Krobkru II was in the vertical direction (Fig. 7), whereas that of Krobkru was in the horizontal direction. The second is that the sound editor for Krobkru II was Pattarapong Sripanya. The rests are similar: the engagement with the piece and the ability to create the new sound and space, individually and all together.

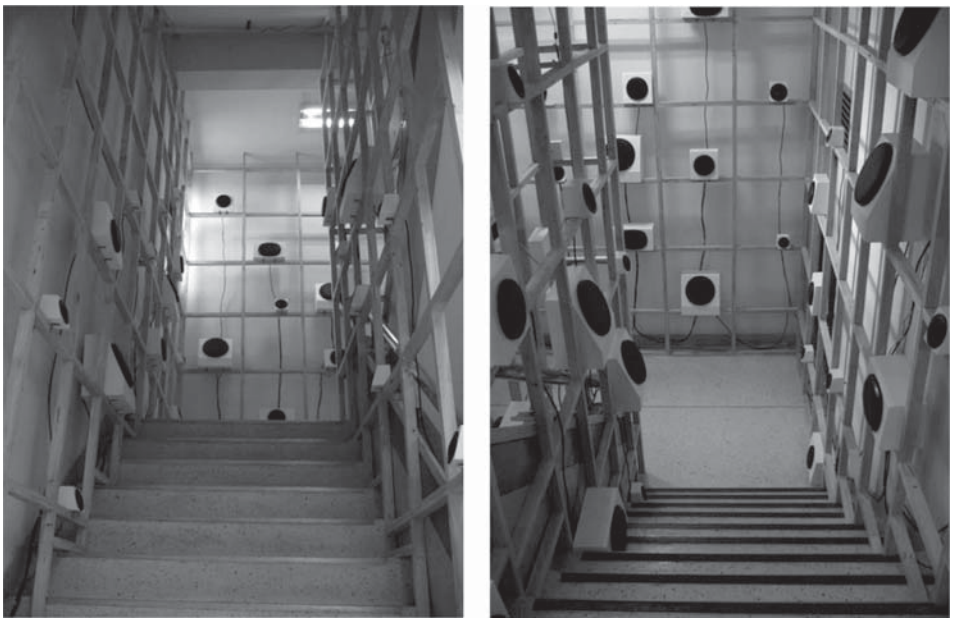

Fig. 7: Krobjru II, being exhibited within a stair from Level 3 to Level 4 of the Princess Maha Chakri Sirindhorn Anthropology Centre
source: Apiradee Kasemsook.

From these three examples, we can see that sound is treated as a medium and material. Through the event-site relationships, sound becomes a means together with visualisation to recall or construct some memories of places or events. However, the extent to which the sound and the visual work together to present these memories can be direct, contradicted or interactive. In a way, the sound here carries out some socio-cultural notions. It could be said that the sound transcends to be the cultural material that can be designed or curated for the listening, and in these cases, with and without the spatial properties of the original event-site relationships. For it is able to remind or recreate the live memory of a place.

Sound as a cultural material

If sound can be a material, it should also be treated as similar to the other types of architectural materials. This means that the combination, composition, juxtaposition and presentation of sound within/around buildings can be designed and constructive and has cultural-values attached. Sound therefore could be curated for cultural proposes in association with the architectural design, i.e, space. This is a

proactive stance. Instead of designing to achieve the acoustic quality of the room, the design can be made to create a soundscape or to project the spatial quality of the sound, in order to hear any particular sound composition. To some extent, the soundscape can be attached with some cultural reminders, may create a new identity of place, or etc.

An example which tried to create soundscape for cultural mapping and project sub-identity of a place is an architecture exhibition for Thailand Pavilion at the 12th International Architecture Exhibition, La Biennale di Venezia, 2010. The exhibition title is 'Thailand Meet & Greet,' with a subtitle of 'Where shall we meet, in what way we should meet?'. The exhibition was curated by Apiradee Kasemsook and Nuttinee Karnchanaporn with three more curatorial team members, three assistances and three exhibition design and installation team members. The exhibition presented eight possible ways for people to meet in Bangkok through eight designs. The curators selected the eight different sites for the eight designs; all of them covered a range of Bangkok areas from the very far west to the far east. A graphic and filming team led by Krajvit Riremvanich made computer graphic drawings and filmed the anticipated meetings from the eight sites. A sound producing team led by Pattarapong Sripanya also visited the sites with the filming team to observe and record some sounds occurring within the sites.

The exhibition was presented as a series of tables which form a portion of Bangkok. Eight televisions were put up at the locations of the meeting sites. Each television was set to play a film of the site and the adding of the design in order to generate the meeting, by the moving images and the sound of the film. (Figures 8-10) The films were shown in a sequence. When one was shown, in colour and with sound, the others displayed black and white images without sound. When the eight film were completed, the visitors could constructed the soundscape map of Bangkok through the ways in which the people meet within the selected representative sites. In this way, Bangkok could be recreated as the meeting and living place from the whole exhibition.

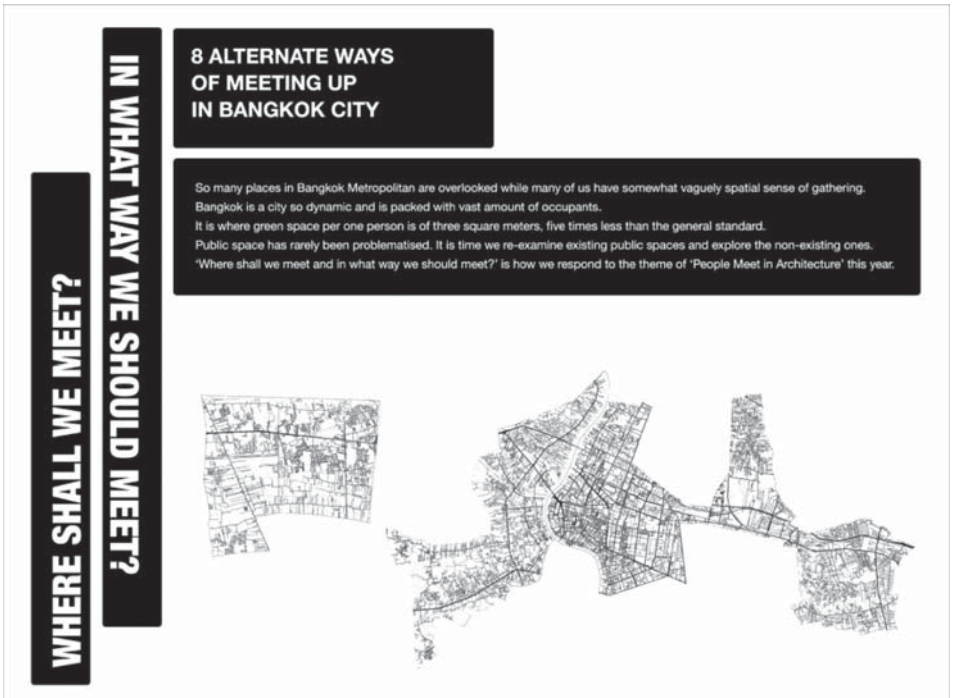

Fig. 8: The selected Bangkok areas for the meeting sites
source: Chanida Lumpthaweepaosal.

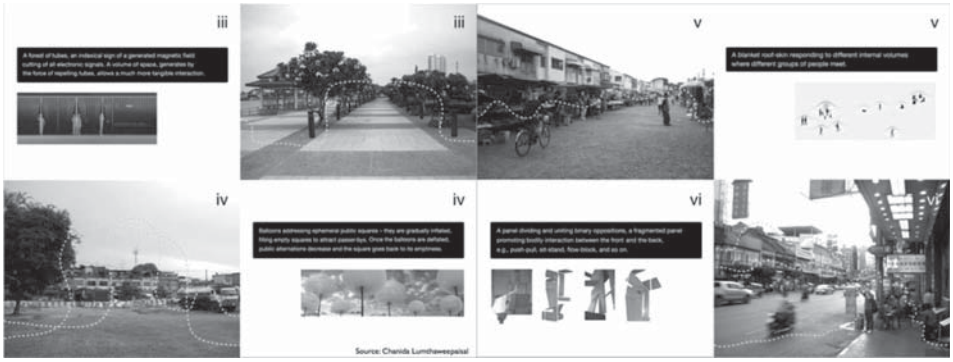

Fig. 9: Examples of proposed computer graphic design superimposed on the scenes of the meeting sites
source: Chanida Lumpthaweepaosal.

Fig. 10: The exhibition

source: Nuttinee Karnchanaporn.

Curating sound /Designing place

These exhibitions show that acoustic design for architects can go beyond the physicality design of the enclosed or the open space. However, it is important to try to put in place some theoretical frameworks so much so that architectural acoustic design can be an emerging discipline. Let us review some history and recent approaches in architectural acoustics.

History of modern architectural acoustics for the enclosed space began when Wallace Clement Sabine, a physicist, was asked by Harvard University's President, Charles W. Eliot, to help fix the acoustic disaster of the Fogg Art Museum Lecture Hall in 1895. He and his team set out to observe, investigate and study three different lecture halls with different acoustic qualities -- excellent, mediocre and terrible -- and without the help of the modern measurement tools. His focus was on the reverberation of sound within the interior halls. It took him three years to provide the findings, the conclusion and a recommendation to correct the acoustic quality of the Fogg Art Museum Lecture Hall (Cavanaugh and Wikes, 1999: 47-51).

Sabine found out that there are two most important acoustic variables in a room that are: shape including size, and material including furnishing (Sabine, 1964). His important findings are: Sabine reverberation equation and absorption coefficients for common building materials (Sabine, 1964). According to Cavanaugh and Wikes (1999: 48), *the Sabine equation states that the reverberation time of a room is directly proportional to the cubic volume of the room and inversely proportional to the sound absorption provided at the room boundary surfaces and by the room's furnishing*. The signification of his findings is the theoretical underpinning the architectural acoustics of a room, which can be scientifically measured and calculated, a knowledge which had been absent by far. As a result, his study and its results set a paradigm and methodology of the modern architectural acoustics until nowadays, as presented in the beginning of this paper.

If Sabine's work is of the physicality of the sound and the architectural acoustic design, during the late 19th and early 20th century there emerged the other famous sound media: the telegram, the radio and the film. The telegram uses sounds as signals to convey the message for communication. The radio uses sound as a medium of expression (Hilmes, 2005: 251). The film uses sound to assist the visual narrative and call out attention (Hilmes, 2005: 251). However, the depth of the ways in which sound is applied in these three media will not be discussed here as it is not the main

interest. The emphasis is on the places where these media occur which significantly link to the architectural design and in recent years turn to provide the background for the emerging paradigm of architectural acoustics.

The emergence of telegram as well as telephone coincides with that of the modern office. People no longer needed to work in the fields or factories, but rather offices. With the help of telegram or telephone, they could communicate with their families or with business acquaintances or partners when they were at the office. Office and home become separable. When being back to or staying at home, one could be connected as well as entertained via the radio, and later television, while they were mostly prohibited in the office. Then, when one wanted to be entertained outside one's own home, one could do so at the cinema theatre, an acoustic place. All these three places have their own unique sound environments.

The issue of unique sounds in different places is the subject of LaBelle's study. His book, Acoustic Territories: Sound Culture and Everyday Life (LaBelle, 2010), explores the identities of places through the occurring sounds of such places. Labelle suggests that the occurring and listening of sound has the spatio-temporal effect, i.e., *ephemerality*, which locates the auditory experience. The auditory experience marks a private space, while the auditory knowledge can create shared spaces, i.e., social space. In addition, sound can mark one own place, help one to find a place or tell one for being out of place. Sound therefore can open up a field of interaction, and be a model for thinking and experiencing the contemporary condition. (LaBelle, 2010: xvi-xvii)

Influenced by Les Back's s sociological approach that the research focus should be put on *the ways in which private lives are now more fully wed to public society*, LaBelle set to examine *the exchanges between environments and the people within them as registered through aural experience* (LaBelle, 2010: xviii). He argues that by concerning the weave between the private and the public there is an *acoustic politics of space* which *unfolds the auditory experience as locational and poignantly embedded within processes of social exchange* (LaBelle, 2010: xix). For him, acoustic space is a disruptive spatiality due to the performative ability of sound (and/or noise) to disintegrate and reconfigure space. *Acoustic space brings forward a process of acoustic territorialization, in which the disintegration and reconfiguration of space becomes a political process* (LaBelle, 2010: xxi-xxiv). He go es on to suggest that sounds and noises have some meanings within specific contexts, for particular

communities. To create, control or bring back sounds is the making of social space. He then analysed some specific everyday life locations and sites: the underground, the home, the sidewalk, the street, the shopping mall and the radio. As anticipated, Labelle found that these sites have their own unique sounds, with echoes, vibrations and rhythms, and consequences from the sounds. To a greater extent, the sounds mark the sites' aural identities.

Labelle is not alone who tried to define the auditory paradigm by suggesting that sound is a material being capable of making social space and help create spatial identity. A review of Hilmes (2005), in his comment on the emerging field called *Sound culture* through the review of two acoustic books -- *The Audible Past: Cultural Origins of Sound Reproduction*, by Jonathan Sterne, and *The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900 to 1930*, by Emily Thompson -- points out that Thompson may be another one who shares LaBelle idea to some extent. Prior to the review of the books, Hilmes indicates that 'the study of sound' has been hailed as an emerging field and remained to do so for the past hundred years. The reason for this, he suggests, are: not enough people interested in the field; and, those who interest tend to concentrate on their own disciplines without crossing to each other, hence they failed to offer an acceptable or systematic theory across disciplines for the field (Hilmes, 2005: 249-252).

Cross disciplinary is the reason Hilmes praises Sterne's book. Sterne *investigates the evolution of concepts of sound and practices of listening, and the changes in social and cultural context that predicted them*. Most importantly, Sterne tried to *make sound visible, to transform it into some form or writing or inscription that could be measured, analysed and understood,* using some devices. Sterne argues that sound technologies and professionalisation of listening *produced 'acoustic space' modelled on the form of private property allowing for the commodification of sound (*Hilmes, 2005: 252-253). Let's leave Sterne here, but it should be noted on his effort to try to represent and visualise sounds with the relation to social and cultural context.

As for Thompson, Hilmes indicates that she shares Sterne's emphasis on *listening rather than sound production*. Thompson emphasises on *the spaces and places of public audition* -- the symphony hall, the urban environment, the office building, the movie place. Hilmes suggests that Thompson turns Sabine's principles to the other way around. By focusing on 'noise' and the ways in which noises are eliminated, she notes that *the acoustic materials are not only eliminate the noises of the modern*

era, but also creates a new and modern sound of their own, though of that period (Hilmes, 2005: 256). The new sound and its rejection of the traditional sound/space relationship, coupled with the sound occurring at the public audition places, create what Thompson called the modern soundscape. The signification of Thompson's work as Hilmes suggests is it *opens up a new dimension in that hypothetical field we might call sound culture studies, breaking free of the notion that sound is the possession of particular forms of content, such as music, radio or films, and placing it in the physical space of its production and consumption* (Hilmes, 2005: 257).

We shall return to our subject: the ways in which the role of architects can be extended in acoustic design. The exhibitions, perhaps, are the attempt to use sounds as materials for different purposes, interpretation and interaction. However, there are some ground in their theoretical unawareness. Sound carries with it the socio-cultural and spatial context and relationship. Place's identity can be marked by occurring sounds, whether it is the private or the public space. The sharing auditory experience and auditory knowledge can turn a space into a shared space, making it the social space. The Sabine's principle once applied can turn an acoustic room into another place by the new soundscape of which the room produces.

The extended roles of architects lie here: the realisation that social spaces can be created by the reproduction of sounds; and, the anticipation and prediction of the new soundscape which can compliment or alter the design. The ways in which architects will apply their design knowledge to respond to these extended roles in relation to sound remain to be challenged. In both roles, a new typology of space or place could emerge. To end here, it hope that the aural perception can be recognised as equally important as the visual perception and as an architectural design realm of its own, with many possibilities to define the experiences as well as the functions and identities of the space -- making a/other place.

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