Sound understanding and urban topology
An alternative approach to sound perception in existent fabric

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Analysis → Site topology

Set parameters → Site topology

Tool box → Define

Site need

Sound perception

Sound as architectural performance parameter
shapes
- concave
- convex
- reflected

Reverberation time
- hard
- medium
- soft

materials
- Transparent
- translucent
- opaque

Tool box 1
Tool box 1

Basic shapes

- Focus
- Disperse
- (Absorbing)

Other

- Amplifier

Artificial barrier

Natural barrier
Tool box 1  Double curves generate surfaces
### Tool box 1

#### Materials
- Hard
- Medium hard
- Soft

<table>
<thead>
<tr>
<th>Material</th>
<th>Reflectiveness</th>
<th>DB Insulation</th>
<th>Fire Resistance</th>
<th>Thermal Insulation</th>
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<td>CONCRETE</td>
<td>0%</td>
<td>0%</td>
<td>60 min</td>
<td>Poor</td>
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</table>
Tool box_ social aspects

• Response to surrounding

  Functional (solving problems)

  Given other identities: Landscape, tourist points…

• Through medium

  source ——> input ——> output ——> people

  Aesthetic: (social need) and Experiment (scientific study…)

• Perception of space

  Function

  Comfort (insulation, to live)

  Spatial qualities (ex: church, music studio, concert hall…)

  Orientation and atmosphere

  Guide (physically and mentally)

  theme
Tool box _ social aspects 1

Old function become landscape

City buffer
Functional
-exhibition
-park

Feng shui
attractive points

Respond to surrounding

Denge: acoustical mirror

Echoing wall

Sound barrier

Central park
Aesthetic effects
interactive

Urban representation
(the hidden musicality)

Harmonic Bridge_Bill Fontana

Musicality collecting –by installing the “device” to map the hidden music.

Through medium

**Tool box_ social aspects 2**
Facetted ceiling, reflective
Echoing, high reverberation
Soundless, absorbing

Snack_ Richard Sera

Jewish Museum_ Daniel Libeskind

Functional shapes
Distorted perception
atmospheric themes

Perception of space

Tool box_ social aspects 3
site
Schouwburgplein is situated in the heart of the city of Rotterdam, and is flanked by the municipal theatre, concert hall, central station, restaurants, and shopping malls. As an urban stage and an interactive open space, the 12,250 square meters theatre square is designed by West 8 under the supervision of Adriaan Geuze. The design emphasizes the importance of a void, which opens a panorama towards the city skyline. It was open to the public in 1996.
Public space, squares and transportation

The flow

The concentrated areas
scouwburgplein

Pass by

Gathered a while

Use service
Old schouwburgplein

View Rotterdam city’s skylines

Flexible and interactive plein
Urban void

Gate
In between the “central station”, “oriental street” and “commercial areas”

Transition
Cultural service
Pathe schouwburgplein

Housings

restaurants

Schouwburg

De Doelen

Interactive hydraulic light

Housings

Café restaurant

office

Schouwburgplein: plaza and parking service

Café restaurant
Sound directs the movement of people, as the orientation, as the presence of space.
The distribution of sounds
1. Traffic
2. Flow of people
3. Enclosed sounds: inside the buildings

Aggregated programs
⇒ huge programs, empty public space
Sound simulation: the original file exported from simulation Soundscape
A. Re-distribute the sounds source
   ⇒ Regenerate the presence of the space
B. Redefine the open space
Strategy:
Break up the aggregated programs (concert, cinema, theater)
Scatter in the site

Use Simulation:
Show the dynamic soundscape
Get the position of the scattered programs
The scattered programs: The culture islands embedded

Islands
A transition, a pre-stage
A. Axis of Shopping preparation
B. Axis of Leisure rehearsal
C. Axis of Life supplies
Axis of shopping preparation

Transition between the islands:
Waiting lounge, hair salon, green

Simulation points distribution

Soundscape

Strategy:
Absorbing: by materials and separations (green and partitions)
Disperse sound (surface)
Translucent polycarbonate:
Sound absorbing good, semi-transparent and good dB insulation

Axis of shopping preparation
Axis of leisure rehearsal and life supplies

Transitional programs distributed along the axis:
- information service
- bicycle rental, gym, sport related facilities
- Supermarket, bank and post service
- green
Translucent opaque glass: sound reflected, semi-transparent and good dB insulation

Noise reduction
green

Axis of leisure rehearsal and life supplies
squares
Transitional surface and functions

introduce the flow

“Absorb”, quiet, sound barrier

“dispersed”, dynamic space, more interactive

“focus”, sport stage

Transitional surface and functions
Tool box defines the surfaces
The squares

1: hair salons
2: gym
3: supermarket
4: garden
5: plaza1
6: plaza2
7: plaza3
8: plaza4

The axis

1: parking
2: parking service, office
3: service
4: bicycle rental
5: post bank
6: sport café

The islands

1: Parking
2: mechanical room
3: cinema hall
4: concert hall
Construction method
Shell structure + columns, reinforced concrete slab

Level 1 parking

Programs slabs

Level 2 parking

Squares surfaces
1. Different elements
   Diameter: 30 cm

2. Reinforced concrete

examples
functions
Cinema halls

Parking service, office

Hair salons

Waiting lounge, cafe

Concert hall

Section of shopping preparation
Sport cafe

Bank, post service

Bicycle rental

Information service

Green roof

Sport shops

Garden

Theater halls

Section of leisure rehearsals
Section of life supplies
movie

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To my parents

The End